

Pooley (J. H.)

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— OF —
PERSPIRATION,

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BY J. H. POOLEY, M. D.,

Lecturer on Surgery in the Columbus Medical College,

COLUMBUS, OHIO.



Reprinted from the OHIO MEDICAL RECORDER, Nov. 1880.

COLUMBUS, O.
COTT & HANN, PRINTERS,
1881.



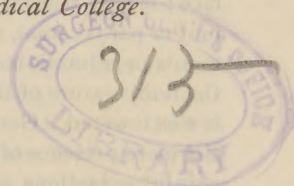
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ANOMALIES OF PERSPIRATION.

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In my last paper I had occasion to notice the excessive and sometimes otherwise altered perspiration caused by injuries to the nerves. In this I propose to consider the various anomalies of that function unconnected with injury. And as the last paper was mainly taken up with cases from my own practice, so this will consist principally of those recorded by others.

The various anomalies of the perspiratory function may be included under the following heads, viz.: Hyperidrosis; Bromidrosis; Chromidrosis; Hemidrosis; Urinidrosis; Phosphoridrosis; Anidrosis: or, excessive, odorous, colored, bloody, urinous, phosphorescent, and deficient sweat.

I. *Hyperidrosis*. — Synonyms; Idrosis, or Hydrosis; Sudatoria; Ephidrosis; Polyidrosis; Hydropedesis; Hypercrinia Sudorale; Excessive Sweating.

By these various terms is designated a condition or disease which consists essentially in excessive secretion from the sudoriparous glands, without any perceptible change in their structure. It may be general, but except when it occurs as a concomitant of certain well known diseases, such as phthisis or rheumatism, it is more commonly local, as of the hands, feet, &c., or partial, being confined to a portion only of the body, as one side, when it is called unilateral. The excessive secretion is in many cases strictly normal, different in no respect from healthy sweat. Sometimes it is abnormal, having a decidedly acid or alkaline reaction. In certain situations, as the feet, it is apt to be fetid; it will then come under another division of the subject. Some of the subjects of this disorder seem to be otherwise in perfect health, but in the majority of instances some concomitant disease is manifest, the most frequent complications being heart disease, malaria, and particularly some one of the so-called neuroses; indeed it may be said that the weight of evidence is sufficient to induce us to regard the hyperidrosis itself as being in all cases essentially a neurosis of the sympathetic or vasomotor system. It exhibits all grades of severity, from a slight increase to such an excess of secretion that it pours in streams from the surface; it may be constant, but is more frequently more or less intermittent or paroxysmal, and may be increased or excited by various excitements or stimuli, both physical and mental. In some recorded cases the temperature of the affected part was markedly increased, in others it was lowered. Generally the annoyance to the patient is confined to the mere presence of the excessive moisture; sometimes disagreeable or painful sensations are present, such as tingling, pricking, a feeling of bursting, &c.; the general health does not appear to be much affected; in one case there was metastatic transference of the phenomenon.

The following case has recently come under my observation, and may be said to be the efficient cause of this paper, as it first drew my attention to the subject.

H. S., aged twenty-one. A tall, slender, rather pale and delicate looking young man, consulted me for excessive and almost constant perspiration of the palms of his hands. He has been the subject of this curious affection for as long as he can remember; when a boy at school his school-fellows used to make fun of him on account of it. His general health is moderately good, but only moderately so; he suffers at times from feelings of debility and exhaustion, and has a good deal of back ache; indeed, without any well defined ailment he is at times a type of what we are in the habit of designating as a nervous invalid. The local trouble as already indicated is not at all times equally severe; as a

rule it is worse when he is feeling poorly, and *vice versa*. When at its worst his hands are thoroughly wet with sweat which rapidly accumulates, and either runs off, or necessitates frequent wiping, and this when the rest of his body is free from perspiration; indeed, his brow is generally free from sweat; he perspires rather freely in the axillæ. Rough use of the hands, as in handling gardening tools, rather diminishes the sweat, but using a delicate implement, like a pen, increases it. One singular feature of the case is, that directing his attention to the subject, as by talking about it, examining his hand, &c., increases the secretion very remarkably. I prescribed ergot, but without any benefit. I am acquainted with a gentleman who is the subject of unilateral sweating of the head and face, to such an extent as to attract the attention of all his friends. I have never been consulted by him on the subject, but have understood that he had some form of heart trouble, either functional or organic, and some of his friends consider him to be quite hypochondriacal about his health. Another acquaintance of mine sweats from a small area or point about the middle of his chin, which he calls his sweat gland, and this takes place when there is no moisture on any other part of the body; he is, and has been for many years, in delicate health from pulmonary disease. Let us turn now to some of the recorded cases.

"The following singular example of partial sweating was communicated to the Medical and Physical Society of Bombay, by A. Duncan, Esq. A man was brought as a recruit to the 25th Regiment, Native Infantry, from the warlike, little territory of Sawant Warree. It was found on the slightest exertion that moisture oozed profusely from his hands and feet. He was a stout, able bodied, healthy looking man, such as it would be desirable to have an army composed of. The word *attention* being given, forthwith on clasping his hands, and that not very forcibly, the perspiration poured rather than dropped from them, the ground was also bedewed around the edges of his feet, and on changing his place, there were his foot prints in thorough wet. Being on a cow-dung floor, and desired to step about, every step was imprinted wet. His body remained unaffected. He stated that he had been all his life subject to this affection; that he was able to work like his neighbors, but got fatigued rather soon; that the various excretions, so far as he knew, were the same in quantity and kind as those of others; that his appetite was similar also; in short, no difference could be discovered between his usual state of health and that of others of good habit, except this singular flow of clear perspiration from the palms of his hands, his fingers and feet.

"Mr. D. had no opportunity of watching the man, to know if all he had said as to his habit of body was entirely accurate; he was evidently unfit for military service, as the grasping of a musket brought the perspiration streaming from his hands."—*India Journal of Med. and Phys. Science*, January, 1837.

In the following cases the affection seemed to own a malarial origin. Gaarder reports a case of hyperidrosis, affecting the right arm only, which was marked by a periodical remission. At night there would be a remission, in the forenoon was a tingling sensation in the limb, and in the afternoon the sweating was most marked. The treatment was quinine, in pill form, two grains every hour. On the third day after the commencement of the treatment, the hyperidrosis had ceased. *St. Louis Clinical Record*, p. 226; Dec., 1877.

Dr. C. H. Lothrop, of Lyons, Iowa, in the *Transactions* of the Iowa State Medical Society for 1880, quotes from a letter of Dr. L. P. Yandell, in which, among other remarks on the subject of malaria, the writer says: "I have just cured a case of Polyidrosis of the hands and feet, in which the perspiration at 4 o'clock daily, and for many hours, dripped in quantities from the extremities, as water drips from your hand when you hold ice in it on a summer's day."

The following case, also apparently of malarial origin, is very remarkable from the rise of temperature on the affected side. It is reported in the *Virginia Medical Monthly* for July, 1878, by Dr. Meriwether Lewis, of Lenoir, Tenn.: "In the summer of 1877, Mr. Granville Morton, aged thirty years, married, came under treatment for intermittent fever. While improving rapidly on appropriate treatment, he exposed himself improperly, and was taken with pneumonia of the right lung. The left lung, also, soon became affected—never so much, however, as the right. Six years before the patient had undergone a severe attack of the same disease, affecting chiefly, as at the present time, the right lung. The present attack passed through the usual stages, presenting the common physical signs of the disease in a very marked and beautiful manner, and by the twelfth day the stage of resolution was fairly established. He was cured of the pneumonia, but not, as the sequel shows, of chills. Eight days elapsed, and then the 'everlasting chills,' as he called them, returned. And now the strange phenomena of the case began to occur. The paroxysms, coming on between three and four o'clock P. M. on each alternate day, presented the usual symptoms of intermittent fever, with the exception that the sweating stage became longer and longer, until, finally, it lasted almost the entire night, and the perspiration was confined *strictly to one side*

of his body—the right—and never passed beyond the median line. Becoming as it were, true nocturnal perspirations in character, and exhausting the patient by their disproportionate severity, they were treated accordingly. In addition to regular doses of quinia, the patient received a special treatment for the prespiratory stage in the following prescription :

R. Quiniæ sulphatis.....	3 ij
Morphiæ sulphatis.....	grs. vi
Zinci sulphatis.....	3 i
Ac. sulph. aromat.....	3 i

M. Twenty drops in water every four hours during the night.

Under this treatment the chills soon ceased to occur, while the nocturnal sweating continued to some extent for several nights. Gradual improvement, however, was merged into complete relief on the seventh night by the addition of sulphate of atropia to the prescription. From this time the patient's health continued pretty fair for nearly a year, when he was again attacked by his old enemy, the chills. Unilateral perspiration again took place, but did not amount to hydrosis. Recovery rapidly took place under appropriate treatment, but still the patient continued to perspire, when at all, on one side only, never exceeding the exact median line. I extract from my case-book the subjoined examination of the patient at the beginning of this attack:—March 15th, 1878: Right side perspiring freely to the median line; left cold and dry. Temperature in the right axilla, 104° F.; in the left, 100 $\frac{7}{8}$ ° F. Lungs; right, some dullness over upper lobe; sounds normal with the exception of slight mucous rales in the upper part; left, perfectly normal. Heart normal in size and action. Some soreness of spine over the first and second lumbar vertebræ. Pulse 88; appetite moderate; bowels regular; kidneys normal; perspiration intensely acid; urine free from albumen; phosphates and chlorides abundant. Another examination made on the 10th of April, 1878, gave the following results: Chills have ceased, right side perspiring slightly; temperature in the right axilla 100° F., in the left 98 $\frac{1}{2}$ ° F.; perspiration acid; kidneys, and all his organs generally, in a pretty normal condition. Is actively engaged on his farm.

"As perspiration tends powerfully to prevent, as well as to reduce, excessive temperature, it is exceedingly strange that there should be a difference of 3 $\frac{3}{8}$ ° F. in favor of the dry or unperspiring side. While the former attack of hydrosis was at its maximum last summer (1877), there was frequently a difference of two degrees F.; but this was never exceeded. At that time the perspiration was neutral."

In the above interesting case, the perspiration was either neutral or acid. I find one in which it is said to have been alkaline:—"A man forty-five years of age, often affected with exhaustion, began in December to perspire profusely every morning, rheumatic affections being at the same time very prevalent. The perspirations gradually increased, and so reduced the patient that at the end of January he was emaciated to a skeleton, and could not raise himself in bed without assistance. The perspiration, which was more profuse at night than during the day, exhibited a peculiar earthy smell; it restored to reddened litmus paper its original blue color, but contained no sugar. With all this, the patient was perfectly free from fever, and only felt a little chill when kept out of bed whilst it was being dried; his appetite was very good; thirst slight; urinary excretion increased, rather darker than usual, but neither exhibiting the presence of albumen, nor any precipitates, it was acid when first voided, soon after becoming ammoniacal; bowels regular. The thoracic and abdominal organs being all in a perfectly healthy state, the author considered the disease as idiopathic ephidrosis. Different remedies were employed, without apparent effect; and the disease, after a duration of nineteen weeks, as gradually disappeared as it had been developed. But even then the usual strength was so slow in returning that six months after the entire cessation of the perspirations, the patient could not perform his accustomed work. The foregoing case is so far remarkable, that, at a time when acid was so decidedly prevalent in some of the secretory products, the perspiration of the man not only did not have an acid reaction, but, on the contrary, colored the reddened litmus paper blue." Dr. Philip, in Casper's *Wochenschrift*, quoted in the *New York Journal of Medicine*, Nov., 1844.

Galtman, in *Centralblatt*, 1876, No. 4, states that a tuberculous man, aged forty-four, had pain in the head and throat of the left side of the face and neck. By arduous labor a secretion of sweat was induced, and there was also reddening of the left half of the face, especially of the left ear, and the temperature in the left auditory canal was one-tenth of a degree higher than in the right side; no trophic disturbance was visible, but the left eye was prominent and freely movable, and presented a strong injection of the conjunctiva, and secreted tears at times easier than the right; the eye reacted normally to light.

The following is a case of metastasis, or transference of the sweating from the feet to the hands. Hildebrandt reports, *Deutsche Wochenschrift*, No. 20, the case of a soldier who dusted salicylic acid mingled with starch and talc on his feet seven times during three weeks to suppress the abnormal perspiration. The latter ceased temporarily, but re-

occurred during marching. The powder was reapplied a couple of times, after which the palms of the hands perspired freely, the water running in streams from them, while the feet scarcely perspired even during prolonged marching in very hot weather. The remaining portions of the body were at the same time quite dry. Hildebrandt also observed the same phenomena in another soldier who used this powder, though the perspiration of the feet did not cease entirely. The following cases are reported by Prof. Bartholow: "The first case is that of a cachectic individual, who had a tumor, aneurismal or malignant, at the base of the neck, which had grown upward from within the thorax. Not having had an opportunity of examining this morbid growth, I cannot pronounce as to its nature; neither is the determination of this point material to the inquiry. The facts of importance are, 1st, the existence of a thoracic tumor on the right side of the thorax; 2d, the occurrence of unilateral sweating on the right side of the head. The sweating, which was profuse, terminated abruptly at the median line. The pupil on the same side was contracted. No thermometric observations were made on the temperature of the affected side; but there was considerable redness of the lobe of the right ear, and a subjective sensation of warmth in the affected parts.

"CASE II. A gentleman of Cincinnati, aged about fifty, in robust health. About a year ago he first observed that the right side of his head sweated very freely, while the left side was almost free from perspiration. This difference in the activity of the sudoriparous glands on the two sides became very marked indeed, so that he experienced great apprehension as to the result, although his general health continued good. When he consulted me, I explored the thoracic organs very carefully, especially the heart and great vessels, but I was unable to discover a tumor or lesion of any kind. The pupils were equal in diameter on the two sides, and there was no apparent alteration of the circulation in the right eye. Mental emotion or active exercise caused the sweat to break out on the affected side, where it stood in enormous drops, almost no moisture being perceptible on the opposite side. A subjective sensation of heat preceded the outbreak of sweat, but I could not perceive that there was a real elevation of temperature. Neither the direct nor induction currents changed the condition of the parts. Sensation—of touch, of pain, of temperature—remained unaffected over the whole sweating region. There was no apparent disturbance in the function of any organ.

CASE III. S. M., aged thirty-nine; nativity, Ireland; occupation, laborer. Two years ago was attacked with a severe cold, since which

time cough has been always troublesome. Has suffered once or twice from edema of the lower extremities. He was emaciated and feeble, with marked evidence of lung disease, but the peculiarities for which the case is reported, are the state of the left pupil and sweating of the left side, especially of the head. The left pupil is more contracted than the right, and does not respond so readily to the stimulus of light. When quiet there is a perceptible difference in the moisture of the right and left sides of the body. On taking active exercise the sweat stands in large drops on the left side of the face and head, the right being comparatively dry. The temperature of the right meatus auditorius is found to be $99\frac{1}{2}^{\circ}$ F., whilst the left is 99° F.; of the right axilla 99° F., of the left $98\frac{3}{8}^{\circ}$ F. After active exercise the temperature of the right meatus is $98\frac{1}{2}^{\circ}$ F., and the left the same; of right axilla $98\frac{1}{2}^{\circ}$ F., left 99° F."

Dr. H. C. Robbins, of Dement, Ill., reports the following in the *Boston Medical and Surgical Journal*, for July 9th, 1868: "J. W., aged twenty-two, while in the army six years ago, contracted diarrhea, which confined him to the hospital for several weeks. Upon his recovery, he first noticed the phenomenon of profuse perspiration of the left side of his face, which condition still continues, nearly six years after it was first observed. His health is perfect in every other respect, and his mind is clear and strong, but every few minutes, winter or summer, he is obliged to wipe the sweat from one side of his face. He is now a farmer, strong and energetic."

Prof. Ebstein, of Gottingen, in *Virchow's Archives*, reports the case of a man sixty years old suffering from angina pectoris, in whom the attacks at certain times were accompanied by transpiration of the left side of the head and neck, and the left upper extremity. There was no redness of these parts, nor dilatation of the pupil of the same side. In the intervals between the attacks of angina pectoris, the sweating took place whenever the patient became fatigued from muscular exercise. At the autopsy of the patient, the cervical ganglia were examined with care, and presented nothing abnormal to the naked eye. On hardening small sections of the left ganglion in Muller's fluid and absolute alcohol, round, dark-brown points could be distinguished, which under the microscope were recognized as vacuoles. These were lined by an endothelium, and contained blood globules; their form was usually round, seldom irregular, stellate; their continuity with dilated vessels could often be established, of which they constituted diverticula alternating with strictured points. The walls of these vacuoles were thickened, and contained, especially at their periphery, a large number of

stellate nuclei. These ganglion-cells, which appeared empty, were markedly pigmented. Nothing was found in the ganglion of the right side. Ebstein is disposed to trace these alterations to the vascular apparatus of the great sympathetic.

Frankie relates a very similar case (*Centralblatt*, 1874, No. 52) of unilateral sweating in a man sixty years of age when he was attacked by difficulty of breathing, hypertrophy of the heart, and enlargement of one of the wings of the thyroid. He found on section of the body after death, in the lower cervical ganglion of the side affected, visible with the naked eye, objects of the size of a grain of sand, which presented, under the microscope, an endothelium, and were filled with blood corpuscles. They were found in the continuity of the blood vessels, and formed varicose dilatations of the same. The ganglion-cells were strongly pigmented, but normal in size. These changes were found only on the side affected. By the increase of the blood, the ganglion fibres were compressed, and a paralysis of the sympathetic ensued.

In an article on Neuroses of the Pneumogastric and Sympathetic Nerves, &c., by Dr. John J. Caldwell, of Baltimore, published in the *Virginia Medical Monthly* for October, 1878, there are several interesting cases of localized sweating related. He says: "I have in my practice a child who when nursing at the breast, sweats at the knees. Here the irritation of the nerves in the act of sucking is conveyed to the sweat centres which throw the sweat-glands in the skin at the knees into increased activity. Why the glands at the knee should be selected is not very clear." Dr. Caldwell in the course of his article refers to the following additional cases of local or partial sweating:—"A lady, aged forty-five, suffered from migraine for many years, and especially at the menstrual periods. There was redness of the whole right side of the face, without previous blushing; the temperature was considerably heightened; the opening between the lids of the right eye narrowed; the right bulbus oculi retracted; the right pupil was narrowed, and the right side of the forehead and cheek moist. The pulse was sometimes greatly decreased in frequency, and pressure on the inner side of the right sterno-cleido-mastoid, as well as upon the spinous process of the seventh cervical and first dorsal, caused some sensibility. Very remarkable was the fact that during the hyperemia of the right side of the face, there was an increase of the capability of the sense of taste to all kinds of substances. This (the writer says,) was a case of paralytic form of the blood vessels, and was cured by the use of the constant current—kathode in the mastoid fossa, and the anode on the first dorsal vertebra."

"In another case, a man forty years old, suffered neuralgia—sometimes the right side, and sometimes the left side of the face was affected—both with paralytic and spastic form of hemicrania. The spastic form was accompanied with a great amount of saliva—about two pounds. Both cervical sympathetics were sensitive to pressure, and the right side of the face was disposed to sweat; sometimes the attacks were accompanied with gastralgia, and ecchymosis of the conjunctiva of the affected side." The author further cites several instances where the sweating followed an irritation in a reflex manner. "Thus Brown-Sequard in his own person finds that when he excites the nerves of taste, as by chocolate, in less than five minutes a very abundant secretion of sweat ensues on the lips, nose and forehead. (*Journal de la Physiologie*, Vol. 1.) Bartley describes a case where a little salt on the side of the tongue produced sweating of the cheek on the same side. Rouyer also details two cases where a similar sweating and redness of the region over the parotid took place on eating. Here, undoubtedly, the nerves of taste called the sweat-centres supplying nerves to the face into a reflex activity."

¶ The following interesting case of unilateral sweating in connection with sciatica, is reported by Dr. Wm. Carson in the *American Practitioner* for February, 1876. The patient, a German, aged fifty-seven, was admitted to the Cincinnati Hospital Dec. 5th, 1874. He was suffering from chronic sciatica on the left side, the details of the symptoms and treatment of which we omit. He had no other discoverable ailment except the unilateral sweating, the following details of which are given:—"A short time after his admission our attention was attracted to the unilateral sweating of the left side of the face and head, of which the following are the principal facts. He had been conscious of it for many years; had noticed that it was more marked after drinks, particularly if they were warm, and that sometimes it was more profuse at the late hours of the night. Objectively, the sweating was limited by the median line of the face and head, the line of the spine of the scapula posteriorly, and the clavicle anteriorly. It was found more or less at every examination in a period of several weeks. The surface temperature was taken several times with a surface thermometer; left temple, 96°, right temple, 97°; was sweating a little at the time; another time, the next day, left temple, 98½°, right temple, 99°. The next day the temperature was 99° on both sides of the face. There was not observed any difference within the mouth as to the two sides. Sometime after these notes, other observations were: Right cheek, 93°, left, 91½°; temples, both 90°; left hip, over glutei, 91½°, over right hip,

89½°; right leg below the knee, on the outside, 91°, on the left, 90°." It will be observed that the temperature of the sweating side over the affected region was lower than the other, though but slightly, whereas in some other cases, as we have seen, it has been found much higher on the sweating side. "No difference in the mobility of the facial muscles of the two sides. No paralysis of muscles anywhere. Subjectively, there was no sense of heat or coldness about the head or face. Once he spoke of a numbness about the head. Often he spoke of having headache, which he did not localize, but which was accompanied with rheumatic pains about the body, 'pains in his bones,' as he called them; has had cramps in his left foot at night, and while putting on his boot on the left foot the left hand has often felt so dry that he would moisten it to make it more comfortable." He was treated with belladonna and atropine, both locally and internally, but with no permanent benefit. The following cases are taken from an article "On the Influence of Belladonna on Sweating," in the *London Practitioner* for August, 1872, by Sidney Ringer, M. D.

"Mrs. P., aged thirty, married, has all her life sweated freely, but much more on the left than on the right side of her body, the excess being most marked on the head and trunk, although the left arm and leg sweat more than the right. The line of demarcation on the face is sharply defined, equally dividing the head down the centre. The sweating on the left side is very profuse, running down the face and soaking her hair and even the bed-pillow. The sweating on the left side of the trunk is most marked, as low as the breast. Slight exercise, sleeping, or exposure to the heat of the fire or sun, especially the latter, greatly augments the sweating. It is markedly profuse when she is out of health. The sweating is unaccompanied by flushing, and does not excite any rash. She suffers from great coldness of the feet, but the right foot is decidedly the colder. She never feels the left hand warmer than the right. The left side of her tongue is always more coated than the right, and has been so as long as she can recollect. There are no bad teeth or other causes in the mouth to account for this curious fact. She is rather deaf on the left side, and when young was very deaf of both ears, but much worse on the left side. Her pupils are equal, and her sight good in both eyes. She is very hysterical, and suffers often from globus hystericus, and from a sensation of heat and weight on top of the head, and palpitation on exertion or excitement. Her urine varies greatly in quantity, sometimes being scanty, at other times very abundant. Her bowels are generally confined, and she is troubled with a cankerous taste in the morning. Her menses are very

scanty and irregular, intermitting sometimes for six months. She does not blush more on one side of the face than the other: and when excited her ears become both equally very red. The skin of the face presents the same aspect on each side. The radial pulses appear to beat in all respects equally. Five months ago she was confined, and since then all her troubles have much increased. The left breast yields much less milk than the right, this being full and distended, while the left is flat and empty. Shortly before her visit to the hospital she was seized with neuralgia of the auriculo-temporal branch of the inferior division of the fifth nerve on the left side, the paroxysm being accompanied by salivation of the left side of the mouth; but previous to this neuralgic attack the secretion of saliva was no greater on one side of the mouth than on the other. During an attack of pain the left side of the face sweated greatly. The application of a weak belladonna ointment to the left side of the face for five to ten minutes, three times daily, greatly reduced the sweating, and equalized that of the two sides. It moreover cured the neuralgia."

"The author has met with cases of profuse local sweating over the loins, covering a surface rather larger than the hand, and exciting a copious eruption of eczema. Here the belladonna liniment checked the sweating, and the eczema at once disappeared."

"In some cases of sweating the belladonna no doubt fails. Thus in one inveterate case, so far from affording relief, it increased the sufferings and sweating in the case of a man who for twenty-two years had been affected with an occasional eruption of the hands and feet, looking at times like eczema, but at other times putting on the appearance of lichen. In cold weather he is pretty well, unless he takes exercise or sits in a hot room; but in March, as the weather begins to get warm, the symptoms set in. His hands and feet swell and feel so tight as if they must burst. At the same time he sweats a good deal, but not while lying down; but directly he rises, or even sits, the sweating begins. The sweating is much more abundant in his hands and feet, especially at the finger-tips and the thumb-balls; and at the tips of the ring and little fingers of the left hand it is especially marked. The sweat runs down in drops from the hands, and when he wipes the finger tips he can see the sweat oozing from the pores of the skin. The outer part of his hands, corresponding to the fifth metacarpal bone, is also the seat of great sweating. At the tips of his fingers and the thumb-balls he suffers from severe pricking pain, which he likens to little insects biting their way out. He feels hot all over, and calls it heat in the blood. The attacks are accompanied by a good deal of itch-

ing over his back. The skin of the hands about the nails becomes hard, cracks, and bleeds. A little rash similar to that described appears in the clefts of the fingers and over the back of the hand between the thumb and forefinger. In this patient's case, as has been stated, belladonna ointment applied to the hands greatly aggravated all his troubles and increased the sweating."

"A middle-aged man, after much mental worry, suffered from excessive sweating of both cheeks while eating, especially hot meat or vinegar; the sweating ceased immediately after the meal. This man passed at times a profuse quantity of pale urine. Ten drops of tincture of belladonna taken three times a day completely checked the sweating."

"A middle-aged man, a sufferer for several years from unilateral sweating of the right side of the face and neck, applied for relief from a pain in his side. He was found to be sweating very profusely from the right side of his face and neck, from exertion and the great heat of the weather. To relieve his pain the twelfth of a grain of morphia was subcutaneously injected, which appeared to increase the sweating, although it was difficult to be sure of this: while still sweating profusely, so that on wiping his face the sweat could be seen rapidly oozing from the skin, we injected 1-100 of a grain of atropia under the skin of his arm, and in about a minute the sweating entirely ceased, and his face remained quite dry, till his dismissal about three quarters of an hour after the experiment."

To these numerous cases of local and partial sweating I will add two of excessive general perspiration under unusual circumstances.

"A man twenty-five years of age, strong and healthy, was for many years from time to time the subject of abundant sweating, which came on at two or three o'clock in the morning, without any appreciable cause. The secretion was so abundant that the mattress on which he lay was completely soaked, and it was general over the whole body. Sulphate of quinia not having proved of any service, Vignard prescribed the following decoction: leaves of sage a handful, water half a pint. These are made to boil for about two minutes; they are then left to get cool together; the fluid is strained and sweetened to the taste. It is taken in the evening. The sweating ceased from the first day of the use of the decoction, but reappeared with the suspension of the treatment." *Edinburgh Medical Journal*, Nov., 1869.

The following case is related by Dr. J. A. Lawrie, Surgeon to the Glasgow Royal Infirmary: "The patient, aged about sixty, was subject to biliary derangement. One of these attacks was brought on,

April 28, 1849, by some bad porter, and on May 1st, he had severe pain around the umbilicus, followed by bilious vomiting. On the night of the 2d he slept comfortably till half past one A. M. of Sunday, when the most violent perspiration came on and remained unchecked till six A. M., and rendered all the bed clothes dripping wet as if they had been dipped in water. At ten A. M. severe rigors followed, then cramps in the limbs and intense pain in the abdomen, for which a large blister was applied; he was very weak and restless; pulse small and easily compressible, voice husky; choleric; hands bleached; cold perspiration, especially on the head; countenance sunk; intense thirst and desire for cold water; with great feeling of internal heat. These symptoms increased in importance and severity until Monday, when the pulse was almost imperceptible; constant restlessness and tossing; no urine. In a word, he had all the symptoms of a patient about to rally from an acute attack of cholera. Brandy, cold water, and beef tea had been ordered, but he refused everything except cold water. From this time he began to rally, and was able on the next day (the 4th) to rise and shave himself. Symptoms of some importance, however, continued on the 5th; vomiting of a decidedly bilious character and a comatose state of the brain; 6th, the same condition of brain with severe vomiting and a copious vesicular eruption on the nose and lips. These symptoms became more mitigated, and at length the remaining part of the case was that of a mild but tedious secondary fever, from which the patient did not recover until the 10th of June."

On this case, the reporter, among others, makes the following remarks: "The points of interest in this case appear to be—1. The amount of perspiration. I have never met with any case in which the same amount of fluid was discharged from the skin in the same brief period. 2. Its immediate effect. I have never before seen collapse produced by perspiration. In this case it was complete, the patient being for sometime pulseless. It is worthy of remark, that the collapse was less sudden than in cases of acute cholera. It did not reach its acme till nearly twenty-four hours after the excessive perspiration had ceased. 3. I have asked myself, is this a sporadic example of the *Sudor Anglicanus*, sweating sickness, of the 15th and 16th centuries? And I am inclined to reply in the affirmative."

With regard to the cases thus collated, the following remarks are obvious, and suggest themselves at once. They are all associated with certain conditions: 1. With aneurismal or other thoracic tumors, angina pectoris, exophthalmic goitre, &c. 2. With certain neuroses, as neuralgia, hysteria, &c. 3. With malarial fever. 4. With no ascertain-

able lesion or alteration in the function of any part, except the skin affected. This last class, however, is the smallest, and perhaps would grow smaller still could all the cases have been subjected to a more searching investigation. In all the first three groups we can easily imagine a connection with disturbance of the sympathetic nerve system, though we may not be able in the present state of our knowledge to point out its exact mechanism. While in some of the cases the direct influence of pressure from diseased organs seems plain enough; and in two of the cases, where a post mortem examination of nerve ganglia was made, decided pathological abnormalities were discovered of almost exactly similar character in the two instances.

In the cases of unilateral sweating, we find the right side affected seven times, the left six times, while in a few cases the fact is not mentioned, so that no inference can be drawn from this circumstance.

In the treatment of this affection, various means, both local and general, have been recommended and tried with varying success, the chief of these we will now mention. Ringer, as we have seen, found belladonna or atropine useful in the majority of instances, and curative in some, though he admits that in others it not only did no good, but was positively hurtful. It is undoubtedly the most reliable as well as rational remedy we possess, and may be used locally in the form of tincture of belladonna, liniment, or ointment of belladonna, or solution of atropia. Internally, the most powerful mode of application would be undoubtedly hypodermic injections of atropia. This may be given in much larger doses than recommended by Ringer, who mentions 1-100 of a grain; twice this I should consider by no means a large dose, but the smaller one should be tried first, and if it succeeds, well; if not, it should be increased until effects, either curative or unpleasantly toxic, are reached.

Electricity has succeeded in at least one recorded case, but failed in others; it has not apparently been used very often, and certainly deserves a further trial. Vignard, as we have seen, was successful with sage tea, and I myself believe that this homely domestic remedy is more worthy of confidence than the profession at large seem willing to concede. He states that its efficacy may be increased by the addition of alum or sulphuric acid, and from his experience we learn that the remedy should be persisted in for sometime after the cessation of the sweating. Dr. Christman, it is stated, in the *Wurtemb. Med. Corresp. Blatt*, 1869, No. 20, has seen in many cases of excessive perspiration, a diminution of the cutaneous discharge ensue promptly upon the exhibition of

ergot, eight to ten grams four times a day. I have tried it without any good effect.

Various stimulating and astringent applications have been recommended, such as bathing with dilute alcohol, solutions of tannin, alum, &c. One writer is very enthusiastic over the liquor from tannyard, though why this should be any better than a solution of tannin is not plain to me.

Ringer and Bury have given (*Practitioner*, Dec., 1876, p. 401,) the results of some interesting experiments on the effects of pilocarpine, used hypodermically, in cases of unilateral sweating. The first patient was a woman, aged forty-six, who had paraplegia ten years, and had been suffering from unilateral sweating of the left side for nine years; the least exertion causing profuse perspiration. Six hypodermic injections of pilocarpine were given; each of the injections contained one-third of a grain of the alkaloid, except the last when one-half a grain was used. The first three injections and the fifth were introduced into the right arm, the fourth and sixth into the left arm. The first result of the injection in each case was a flushing of both sides of the face, and increased sweating, which gradually declined and ceased altogether in from fifteen to twenty-five minutes. The result of this case was that the patient was cured. This looks rather like homeopathic treatment. In the other patient, a cabman, who had right hemiplegia with unilateral sweating of the same side, the pilocarpine only effected a temporary abatement of the symptoms; the sweating was finally controlled by atropia. It is hardly necessary for me to mention the mineral acids, oxide and sulphate of zinc, &c., as they have been long before the profession, and their general worthlessness is pretty well recognized. Of course every remediable disorder of the general system should receive proper attention, and every known or possible exciting cause be avoided as much as possible.

Since writing the above, my friend Dr. Gilliam, of this city, has related to me the following circumstance: Some years ago Dr. Bell, of Nelsonville, Ohio, had a patient who had been for years a great sufferer with neuralgia of the face accompanied by unilateral sweating. The Doctor gave him stramonium in such large doses that severe toxic effects were produced; both physician and patient were seriously alarmed, the former so much so that he thought seriously of fleeing the town. But the event of the matter not only quieted their fears, but went beyond their best hopes, for the patient was completely cured of his neuralgia, and of his unilateral sweating as well.

The "sweating sickness" has been alluded to, and perhaps a passing

notice of this extraordinary epidemic may not be out of place just here. This disease first made its appearance in England in the early autumn of 1485, and in its four subsequent visitations was confined mainly to that country, though in one of them it spread to some extent to Germany and the parts adjacent. Commencing as stated, by the end of the year it had spread over the whole of England, and caused the death of an unnumbered multitude of people; by the beginning of 1486 it had disappeared, not to occur again until 1506. This epidemic was less fatal than the first, mainly from the greater common sense exhibited in its management. It was confined to England, nowhere occasioning any great mortality. The third attack began in April or May of 1517. On this occasion it was so violent and so rapid in its course, that it carried off many of those attacked in two or three hours, so that the first shivering fit was regarded as the announcement of certain death, and many who were in good health at noon were numbered among the dead at evening. The mortality is stated by all writers to have been very great, but the almost total absence of statistics in their accounts renders it impossible to reach even an approximation of its amount. The fourth, and most fatal, outbreak began in England during the latter part of May, 1528, and in the following year appeared in Germany, where it had at least one beneficial effect, if, as one writer states, it was the means of putting an end to the disputes between Luther and Zwingle concerning the eucharist, which were on the eve of kindling a religious war. This epidemic is spoken of by some historians under the expressive name of *the great mortality*. It spread to the Netherlands, to Denmark, Sweden, and Norway. Among the Continental people its fatality was much increased by their absurd treatment of the sick, who, it was believed, if they wished to escape death, must perspire for twenty-four hours without intermission. "So they put the patients, whether they had the sweating sickness or not (for who had calmness enough to distinguish it?), instantly to bed, covered them with feather beds and furs, and whilst the stove was heated to the utmost, closed the doors and windows with the greatest care to prevent all access of cool air. In order, moreover, to prevent the sufferer, should he be somewhat impatient, from throwing off his hot load, some persons in health likewise lay upon him, and thus oppressed him to such a degree that he could neither stir hand nor foot, and finally, in this rehearsal of hell, being bathed in an agonizing sweat, gave up the ghost, when, perhaps, if his too officious relatives had manifested a little discretion, he might have been saved without difficulty." How much consideration was given in those times to the

feelings of the sick we may judge from the following sentence from what, on the whole, must be called a very sensible pamphlet, published for popular distribution at this time: "Once for all the patient must not have his own way; what he would have you do for him, that must not be done."

Full three and twenty years now elapsed, no trace of the sweating sickness showing itself anywhere, when the old enemy again, and for the last time, broke out in Shropshire, on the 15th of April, 1551, and lasted about half a year, namely from April 15th to September 30th. This was the epidemic witnessed by the celebrated Dr. Caius, and the occasion of his book which was entitled, "A Booke, or Counseill against the disease commonly called the Sweate, or Sweatyng Sicknesse, made by Jhon Cains, Doctour in Phisicke. Very necessary for every personne, and much requisite to be had in the handes of al sortes, for their better instruction, preparacion, and defence, against the soubdein comyng, and fearful assaulting of the same disease. 1552."

His advice, such as it was, came too late, for the disease has never appeared, except possibly in rare sporadic instances, since 1551; nor does his book, it may be fairly added, contribute anything to our knowledge on the subject. I cannot, however, resist the temptation of giving two short extracts from this quaint and exceedingly rare book. The first is a graphic description of the fatality of the pestilence on its first invasion. "It immediately killed some in openyng their windowes, some in plaieng with children in their strete dores, some in one hour, many in two it destroyed, & at the longest, to them that merilye dined, it gave a sorrowful supper. As it found them so it toke them, some in sleape some in wake, some in mirthe some in care, some fasting & some ful, some busy and some idle, and in one house sometye three sometye five, sometye seven sometye eyght, sometye more sometye all, of the whyche, if the haulfe in every Towne escaped, it was thoughte great favour." And the following bit of advice is perhaps as applicable now as it ever was: "Therefore seke you out a good phisicien, and knowen to have skille, and at the leaste be so good to your bodies, as you are to your hosen or shoes, for the wel making or mending wherof, I doubt not but you wil diligently searche out who is knowen to be the best hosier or shoemaker in the place where you dwelle; and flie the unlearned as a pestilence in a comune wealth."

This very extraordinary disease known as the Sweating Sickness, English Sickness, Sudor Anglicus, &c., seems to have been an epidemic ephemeral fever, with no very characteristic symptoms, except the enormous sweats. It bears some resemblance, in its short duration and

frequent relapses, to our modern relapsing fever, but I think Niemeyer is manifestly in error in his effort to identify it with miliary fever, which I believe to be quite a different and distinct disease. The prodromata were ill defined, and uncharacteristic, consisting of chilliness, succeeded by some heat, pains in various parts of the body, particularly the back of the neck. "But the sweating was peculiar and enormous; in the course of a short time, and in many instances at the very commencement, the *stinking sweat* broke out in streams over the whole body. In others the sweating was longer delayed, while in the meantime a slight rigor of the limbs existed; it then broke out profusely. It was thick and of various colors, but in all cases of a very disagreeable odor, which, when it broke out again after any interruption to its flow, was still more penetrating (*odoris teterrimis*).” Some compared it to the smell of rotten straw or musty vinegar; possibly the odor proceeded from decomposition of the sweat which soaked the bedding.

Some physicians attributed the disease to the decomposition of water in which hemp had been steeped. A more probable cause is to be found in the unutterably filthy habits of the people, and their entire ignorance of any relation between cleanliness and health, which produced so many devastating pestilences during the middle ages. But why it should be renewed so many times at irregular intervals, and should at length entirely cease, are questions not so easy to answer.

Three other epidemic diseases characterized by excessive perspiration remain to be briefly noticed. These are, first, the *Morbus Cardiacus*, cardiac disease of the ancients, which appeared for a period of 500 years, from 300 B. C. to 200 after Christ. It was described by Erasistratus, Aesclepiades, Aretæus the Capadocian, Cælius Aurelianus, Soranus, and others. The second is miliary fever, called also the Picardy Sweat, &c., which has often prevailed, not only in Picardy, but also in other parts of Europe, for more than a hundred years, and even at the present time exists in some places as an endemic disease. It is characterized, in addition to the profuse sweating, by a miliary or sudaminous eruption. Suffice it to say of it that more than 125 epidemics have been noticed or described. Lastly, the following localized epidemic, or the Röttingen Sweat as it is called, is unique in the history of medicine:—

“In November, 1802, a very hot and dry summer had been succeeded by incessant rains. Thick fogs spread over the country, and enveloped such places in central Germany as were inaccessible to ventilation. Amongst others, the small Franconian town of Röttingen, situated on the river Tauber, and surrounded by mountains. Scarcely had a few weeks elapsed, when unexpectedly, towards the 25th of November, an

extremely fatal disease broke out in the town, which was without example in the memory of its inhabitants, and totally unknown to the physicians of the country." "Strong, vigorous young men were suddenly seized with unspeakable dread; the heart became agitated and beat violently against the ribs, a profuse, sour, ill-smelling perspiration broke out over the whole body, and at the same time they experienced a lacerating pain in the nape of the neck, as if violent rheumatic fever had taken possession of the tendonous tissues. This pain ceased sometimes very quickly, and if it then shifted to the chest, the distressing palpitation of the heart recommenced; a spasmodic trembling of the whole body ensued, the sufferers fainted, their limbs became rigid, and thus they breathed their last. In most cases all this occurred within four and twenty hours." I do not find it anywhere stated how many perished from this visitation, but infer from the tone of the report that the mortality was considerable, but panic would be easily excited in such a small and isolated community. At first it is said they were entirely without medical advice, and the people greatly aggravated the disease by their injudicious sudorific treatment, many being *literally stewed to death*. Government physicians were sent to them, under whose skillful care the sickness rapidly abated.

The disease was confined entirely to Röttingen, and did not make its appearance anywhere beyond the gates of this little town. On the 5th of December, clear, frosty weather set in; from that time no new cases occurred, and all traces of this Röttingen sweating fever, which was never either preceded or followed by miliary fever in any part of Franconia, have from that time disappeared.

A malignant form of hydrosis which appears to correspond with the sweating sickness of the sixteenth century, has occasionally made its appearance in sporadic cases, particularly, it would seem from reports made to the Academie de Medicine, in France. But after all a fair as well as rigid criticism of these cases would lead us to the conclusion that they are but aberrant forms of well-known diseases, characterized, and somewhat confused as to diagnosis, by the occurrence of extraordinary perspirations. They have been seen associated with inflammation of the stomach and intestines; inflammation of the lungs; inflammation of the cerebro spinal axis. They have occasionally proved fatal in twenty-four or forty-eight hours, or the disease has run on for two or three weeks. These cases were observed by M. Marrotte, in the Hôtel Dieu, at Paris, at the close of an epidemic of typhus or typhoid fever which raged in that city in 1842.

Now we know that both at the beginning and the end of epidemics

of various diseases, cases are apt to assume quite puzzling and unwonted forms; and hence we cannot think it very wonderful that at the close of a fever epidemic some cases should occur in which the normal symptoms of the particular disease should be wanting, dislocated as to order of appearance, and complicated with those of a new and unusual character, such as profuse perspiration. Nor can we admit that this forms a sufficient ground for identification of them with the peculiar and well-marked "sweating sickness."

II. *Anidrosis*.—Having considered those cases which are characterized by excess of the perspiratory secretion, we come naturally to speak next of those in which it is deficient. This condition is known as anidrosis, and is a functional disorder of the sweat glands, consisting in a diminished or insufficient secretion of sweat, either general or partial, or local.

Duhring, in his work on *Diseases of the Skin*, speaks of it as follows: "It is the opposite of hyperidrosis. It occurs in the course of certain chronic diseases of the skin, and is particularly noticeable in ichthyosis; the same condition may be observed in patches of eczema, psoriasis, and in elephantiasis Grecorum." I may add also, from my own observation, elephantiasis Arabum. "It may also exist as the result of a congenital deficiency of the sweat glandular apparatus, in which case the person perspires very slightly, and perhaps sensibly only under a high temperature. There are other cases in which the individual ceases at times to sweat. In these instances the health is more or less impaired, and serious symptoms often arise, especially during the warm weather. It is at this season that such cases are apt to come under observation. Occurring as an independent disorder, it is rare. I recall meeting, two summers ago, the case of a man—a blacksmith—who suddenly, during the hot weather, ceased sweating. He was, when I saw him, several weeks after the trouble first manifested itself, unable to pursue his occupation, and complained greatly of indisposition, headache, and other symptoms of distress." Mason Good says, *Study of Medicine*: "It is affirmed by some writers that there are persons who never perspire. This demands ample proof; for experience teaches us that all warm blooded animals either perspire by the skin, or have some vicarious evacuation that supplies its place, as in the case of the dog kind, in which an increased discharge of saliva seems to answer the purpose; though in violent agony, I have known a Newfoundland dog thrown into a sweat that has drenched the whole of his thick and wavy hair."

Broussais asserts that fear and other violent passions have been known temporarily to arrest perspiration completely, though they generally have quite the opposite effect.

Wilson remarks, that, "diminution of perspiratory secretion from arrest of function of the sudoriparous glands has hitherto been observed only in relation with febrile diseases." An observation which is obviously inaccurate, and which is scarcely in accord with other remarks which he makes, for he says further: "It is probable, however, that the perspiratory secretion, like that of other secreting glands, may be diminished and checked as a consequence of inflammatory disorder of the sudoriparous glands, independently of the rest of the organism." The dryness of skin which we occasionally meet with in some individuals bears no reference to the sudoriparous system, but is dependent on the absence of secretion of the sebiparous glands. In the *Philosophical Transactions* (Abridgment, Vol. 3), is recorded the case of a "gentleman near Leyden, who, being much addicted to the study of astronomy, and spending very many nights in star-gazing, had, by the nocturnal wet and cold temper of the air, in such manner obstructed the pores of his skin, that little or nothing exhaled from his body; which appeared hence, because that the shirt he had worn five or six weeks was then as white as if he had worn the same but one day."

Wilson relates the following case, quite amusing in some of its details, where this affection followed upon its opposite, or an attack of hydrosis: "An eminent actor told me the following anecdote of himself. When a young man, starring in America, he had one night, in the summer time, been playing a tragedy, in which he was violently heated, and had scarcely time to cool, when he was obliged to come on the stage again as Sir Archy MacSarcasm, in Macklin's comedy of *Love à la Mode*. The make up for this character required that he should convert his features, by means of paint, into those of an old man. In the course of the play he was struck by perceiving himself the 'cynosure of neighboring eyes,' particularly those in the front rows of the pit, and concluding that it must be the excellence of his acting which was attracting so much attention, felt highly flattered, and exerted himself to the utmost. From time to time, however, he was startled at the bursts of laughter and applause falling in the wrong places, and was thoroughly puzzled at the unusual sensation he was creating. On retiring to his dressing room, after making his best and most grateful bow to an hilarious audience, the mystery was explained; it was not his brilliant acting *alone* which had brought down

such noisy honors on his head, but the drollery of his face, one half of which was washed clean of its wrinkles by partial perspiration, and displayed the juvenile features of twenty; while the other half exhibited the care worn lines and withered seams of eighty. In his case, while one half the face was affected in this peculiar manner, and the other half was dry, his chest was acted on in a precisely opposite way, the perspiratory side being reversed. At a later period of his life the perspiratory action ceased over the entire body, and, as a consequence, he suffered bitterly in his health."

Niemeyer in his *Practice*, American edition, Vol. 2, p. 474, has the following remarks; "We have already mentioned that a diminution of the cutaneous secretions may form one of the symptoms of senile marasmus. In other instances, as has already been mentioned, it depends upon derangement of innervation; in others, again, it is due to disease of the skin, psoriasis or to ichthyosis, while, finally, cases exist of anidrosis, and now and then even anidrosis of half the body, the causes of which are quite unknown."

On the subject of the deleterious effects of mere suppression of the perspiration in man, the following editorial remarks in the *Lancet* for July 7th, 1877, are so appropriate and interesting that I need hardly apologize for quoting them *in extenso*: "The opinion that the suppression of the functions of the skin produces on man profoundly deleterious effects is as old as the time of Galen, and is a belief almost universally held. It has of late years received remarkable countenance from the experiments upon animals in which the covering of a large part of the skin with an impermeable coating of varnish is followed by systemic disturbances ending almost invariably in death.

"It has been assumed that we are justified in applying the conclusions thus obtained to man, by certain effects which are known sometimes to follow the destruction of a large part of the skin by a burn, and by the well-known instance of the unintentional experiment performed on an Italian boy, by gilding him to play a part in some theatrical performances, with the result of causing his death in a few hours. These facts have seemed to lend color to the influence on the functions of the skin which sudden chills, according to popular pathology, have been supposed to produce, and by which they are believed to cause their deleterious effect. But a consideration of what we know of the functions of the skin renders it difficult to understand the mechanism by which suppression of these functions, such as an impermeable coating produces, can cause such grave consequences. The perspiration is now known to consist almost entirely of water, and there is reason to

believe that no product escapes with it which could not be easily removed by another channel; and the chain of reasoning that the simple suppression of the cutaneous functions in man is followed by consequences analogous to those which result in animals, presents the grave defect that it is unsupported by any careful and purposed observations. The investigations of Senator, however, furnish us with some very important and unexpected information, and if not numerous enough to be absolutely conclusive, they are of a most significant and suggestive character. Some of them were made four years ago, and other more recent observations are described in the current number of *Virchow's Archives*.

"The experiments were suggested both by a desire to ascertain how far the results obtained on animals were applicable to man, and further by a consideration of certain facts which show that the functions of the skin can be interfered with to a considerable degree, without prejudicial results. Senator points out that inunction of the skin, and the application of plasters to large portions, are constantly adopted without any ill effects referable to the interference with its function, and occasionally no special results can be traced from an extensive burn, comparable to that which would result from the varnishing of a corresponding area of the skin of an animal. Frequently the whole skin is so changed by disease—psoriasis, ichthyosis, &c.—that its functions must be gravely interfered with, and yet no ill result follows.

"In his experiments on pyrexia, Senator varnished areas of the body, and noted the relation between the area covered and the body weight, and the effect on the temperature. He made his observations especially on persons with an abnormally high temperature, in the hope of finding a therapeutical indication for the practice. The skin was rendered impermeable by sticking plaster, thick ointment, flexile collodion, and a solution of gutta percha in chloroform. Finding that no prejudicial effects resulted from varnishing a moderate area of the skin, he became bolder and covered the abdomen, or thorax and back in addition to one extremity. He concluded that no ill effects could be attributed to the rendering impermeable an area of the skin equivalent to one half the body area, which certainly could not have been thus treated in animals without producing grave symptoms. On two grounds, however, the validity of these conclusions is open to objection. In the first place, these observations were made on patients suffering from fever, especially typhoid fever, and it is not certain that the same results would be obtained with healthy men. In the second place, the knowledge that the effect of an application to the skin is marked in

inverse proportion to the size of the animal suggests the idea that in man the area of the skin covered may not, after all, have been sufficient to produce those effects which occur when a similar proportional area in a smaller animal is coated. For these reasons Senator has made three other observations. All the varnishes used in animals cannot be employed in the case of man, for obvious reasons, so the extremities of three apyrexial individuals were well covered with adhesive plaster, and the backs with flexile collodion. Where, through movement, the plaster might be loosened it was additionally secured by collodion. Such a covering would certainly cause the death of an animal if maintained for several days. Collodion, however, has not been commonly employed in varnishing warm-blooded animals, and therefore Senator made some special experiments, and found that it was equally effective upon them as the varnish commonly employed. A third observation was made by coating the skin with tar, which he ascertained caused in the animal the same effect as varnish. The results of these experiments on man compared with those on animals, were entirely negative. None of the striking consequences, manifested by animals where only one half of the surface of the body has been covered with varnish, were to be detected in man. There was no sign of the depression of temperature, muscular weakness, dyspnea, spasm, paralysis, albuminuria, diarrhea, serous effusion, which animals manifest. In one case there was some nausea and vomiting, but it subsided before the removal of the application. In one case there was a slight irritation of the bladder, but this was attributed to the absorption of turpentine from the plaster. One case presented an increase in the quantity of urine. In the case in which the surface was smeared with tar, there was a slight indication of the absorption of carbolic acid; and a very slight fall in the temperature in one case, Senator ascribes to the exposure of the body and the evaporation of the ether employed in the varnishing.

"The conclusion which he draws is that the suppression of the function of the skin has not the same effect on man as on animals. To this conclusion, however, the case of the 'gilded boy' seems at first sight to be opposed. Senator points out that the opposition is rather apparent than real, for it cannot be admitted that the death of the lad resulted from the same mechanism as that which causes the death of varnished animals, since the boy died the same night, and animals always live for several days, even when manifesting the greatest susceptibility to the procedure. He suggests the details of the case render it far more probable that the boy's death resulted from the absorption of some poison employed in the gilding, and that the comparison with the varnished animals is misleading.

"Dr. Senator's facts and conclusions are doubtless of great importance and value, but they leave certain elements of the problem undetermined, which further observation only can solve. It is probable that varnished animals die, not only from a toxic influence of the unexcreted sweat, an influence which some experiments of Röhrig substantiate, but from the rapid loss of heat consequent on dilatation of surface vessels, and the rapid conduction of heat from them by the varnished skin. This is an element in the effect from which man is free, since the patients experimented on were covered with bed clothes or wearing apparel, and the loss of heat from this cause would be prevented. But this does not account for all the discrepancy between the effects on animals and on man, since prevention of loss of heat does not always prevent the deleterious effects upon animals of the varnish, and there must be, as Senator suggests, an essential difference between the relation of the two organisms to the functions of the skin."

We may furthermore remark that in some skin affections, as prurigo and ichthyosis, where the eruption is almost if not quite universal, and in which the disease ordinarily lasts for the life time of the individual, we do not find that the suppression of perspiration is followed by those deleterious effects which might theoretically be apprehended. Hebra, who considers the affection purely from a dermatological standpoint, ignores its existence altogether except as a symptom, or concomitant phenomenon, of the extensive and well-marked dermatoses. But we have sufficient evidence that anidrosis may and does exist without any lesion whatever of the skin, though it is unquestionably a very rare affection. And when so existing it does give rise to symptoms of general discomfort and ill health, or at least is accompanied by such symptoms, though they are not ordinarily of any great severity.

Treatment.—The treatment of this disease, aside from the correction of co-existing symptoms and the cure of accompanying skin affections, resolves itself into such measures as will be likely to restore the deficient secretion. And here we have very little in the way of recorded experience to guide us. Hot, or warm baths, with accompanying frictions, should be tried. Vapor or hot air baths, as the so-called Turkish and Russian baths, may be tried in succession. If these fail, cold baths with thorough friction afterwards would be proper, if there were no contra-indications in the case. Exercise, even somewhat violent, may be resorted to. Various sudorific drugs, such as the stimulating diaphoretics, and above all jaborandi, or its alkaloid pilocarpine should be carefully but thoroughly tried if other means failed; it might be used in conjunction with some of the forms of bathing already alluded to.

In conclusion, I refer to the fact mentioned by Dr. S. Weir Mitchell and others, that local anidrosis has occasionally been observed as the result of gunshot and other injuries to the nerve trunks.

III. *Bromidrosis*. — Synonyms; *Osmidrosis*; *Ephidrosis Olens*; *Odorous Sweat*; *Stinking Sweat*. *Bromidrosis*, strictly speaking, means stinking sweat, or that possessing an unpleasant and offensive odor; *osmidrosis*, sweat of any unusual odor, sometimes agreeable. But inasmuch as this distinction is but seldom observed, but all forms of unusual odor of the perspiration, whether unpleasant or otherwise, are generally spoken of as *bromidrosis*, and as this is the term most commonly in use, we shall so employ it. Where the perspiration has a strong smell, it is also as a rule excessive in quantity, so that the term *epidrosis olens*, is really perhaps more proper than any of the others, but probably because of its being a compound epithet it is scarcely ever employed. The affection may be general or local, *bromidrosis universalis*, or *bromidrosis localis*; the latter being much the more common, especially that form of it which affects the feet, *bromidrosis pedis*.

In treating both of *bromidrosis* and *chromidrosis*, we have to remark that, inasmuch as two sets of glandular bodies exist together in the skin, the sudoriparous and the sebiparous, and pour out their secretion side by side, the cutaneous transpiration, especially when it becomes visible in the form of sweat, is really a compound secretion. Nor is it possible, even when it is desired to do so for purposes of examination, to separate these two secretions from one another. This mixed secretion from the glands of the skin is known as the *materia perspiratoria*; and it is the opinion of some that, in the two affections named, it owes its peculiarities of odor and color mainly if not entirely to the sebiparous glands alone. But that the secretion of the sudoriparous glands may not only participate in giving to the sweat an abnormal odor, but be the main or only source of it, is proved by the singular cases alluded to by Mitchell in his work on injuries to the nerves, in which in addition to local hyperidrosis specially of the palms of the hands, very marked and penetrating odors were given off, and this notwithstanding the perpetual use of water by the patients. *Chromidrosis* will be more particularly spoken of in the next section. With these few preliminary remarks, we will proceed to treat of *bromidrosis*, and first of the general form.

That the exhalations from the bodies of certain persons, are distinctly odorous, often disagreeably so, and this when the individuals are per-

fectly healthy and cleanly, is a fact that must be within the cognizance of all. This fact of difference in the odor of the person is more strongly marked when we notice the various races of mankind, as the well-known but indescribable odor of the negro abundantly testifies. It can scarcely be doubted that this distinction, which to our imperfect sense of smell seems only occasional, is in fact universal, that every individual has his own distinctive odor or smell; by this means the dog is enabled with his acute sense to single out the traces of his master in the most crowded thoroughfare. This acuteness of smell is not necessarily accompanied by any refinement of the sense, according to our notions on the subject, for this same dog will plunge his marvelous nose into the most loathsome and revolting mass of carrion with the greatest apparent enjoyment. It is said that the men of savage tribes and nations will also readily distinguish friends from foes by the smell, and this at very considerable distances; and a boy born deaf and dumb, whose history is related by Dugald Stewart, presented the same power. But however interesting these facts may be, they do not concern us now, but only those cases in which the cutaneous transudation is accompanied by a marked and peculiar odor. The sweat of a man is said to smell more acrid than that of a woman. Though the odor of the perspiration, when perceptible, is usually unpleasant, it has been known to give forth an agreeable aroma, which has been compared to the perfume of violets, roses, and musk. In the memoirs of the Queen of Navarre, we read that Catherine de Medici was a perfect nosegay; and Cujacius, and Lord Herbert of Cherbury, were equally distinguished by the suavity of their transpiration. De Monteaux has noticed a very rank and fetid odor from the perspiration of the whole body. Musk, perhaps the most universally diffused odor among the lower animals, and by no means infrequent in plants, has been but rarely noticed in man. The following are in addition some of the distinct odors that have been spoken of by authors, viz., sulphureous, sour, aliaceous, and the odor of feces. The odor of perspiration, particularly when it contains an excess of acetic or butyric acid, is often intensified by its retention on the surface of the body, and probable partial decomposition, when it has not been unaptly compared to that of musty or rotten straw. Rayer relates the following case: "I had a woman under my care in the Hôpital de la Charité affected with chronic peritonitis, and who sometime before her death, exhaled a very decided odor of musk; the pupil who called my attention to this circumstance had observed the smell for several days while dressing a blister, but thought it owing to a bag of musk put purposely into the bed to overcome other bad

smells. The woman, however, assured us that she had no description of perfumery about her, and I satisfied myself that her linen, which was frequently changed, was not impregnated with any perfume before being delivered to her from the laundry of the hospital. The odor of musk, the existence of which was fully ascertained by myself and several physicians, and which was very perceptible on the arms and other regions of the body, did not become more powerful from rubbing. After continuing for about eight days the smell became fainter, and nearly vanished the evening before the patient's death." Speranza relates a similar case. Schmidt has inserted in the *Ephemerides Naturæ Curiosorum*, the account of a journey-man saddler, three and twenty years of age, of rather robust constitution, whose hands exhaled a smell of sulphur so powerful and penetrating as very soon to infect any room in which he happened to be. Wilson says, "I was once consulted by a *valet de chambre*, who could never keep a place in consequence of the unpleasant odor he left behind him in the rooms which he had been occupied in cleaning. There have been instances of individuals who, to obtain their discharge or immunity from military service, have simulated these offensive perspirations, by rubbing their axillæ with dippel oil, asafetida, a piece of much decayed cheese, putrid fish, &c." The odor in these cases has sometimes been likened to that of a goat, *odor hircinus*, and in some unfortunate instances has been so powerful, penetrating and offensive as to banish the individual from all society.

Certain diseases are said by several authors to give rise to peculiar and distinctive odors of the perspiration. And one would think, to read the confident statements made by some writers, that nothing could be easier than to diagnosticate many ailments by this simple and unerring means. But many of these statements are exceedingly fanciful, and must be received with a large grain of allowance. Beside, the whole nomenclature of odors is entirely comparative, and probably no two observers would agree in the application of these various designations. And moreover the sense of smell is so differently developed, and as far as I can judge so little susceptible of cultivation, that its indications cannot be regarded as worthy of very implicit confidence. One who has what is called a sharp nose, is very apt to be unduly confident in his conclusions from his exceptional power, and announce them far too authoritatively and dogmatically. Thus the sweat of persons with the itch is said to have a mouldy odor, while that of syphilitic patients is said to smell sweet. The sweat of rheumatic and gouty persons has an acid smell, while in putrid fever and scurvy it has a

putrid smell; in jaundice it is said to resemble musk in its smell. In Stark's *General Pathology*, p. 1126, we find it stated that the odor of the sweat in scrofula resembles that of sour beer, while in intermittent fever it smells like fresh baked brown bread. Heim, of Berlin, maintains that each of the exanthemata possesses a specific smell, and that he could detect it so constantly and with such precision as to be in the enviable position of being able by means of this odor, to distinguish these diseases from one another. Thus it is asserted that patients effected with morbilli exhale an odor like that of recently plucked feathers; that in scarlatina the smell resembles that of new bread; in small pox, that of a menagerie; in miliary fever, that of decomposing straw. But the organ of smell must surely be extraordinarily acute to be able to detect these odors; and in any case they have no claim to be termed characteristic, for the substances with which they are compared by no means possess a smell so decided as to prevent the possibility of confounding them with many others. As we have already seen the odor of the perspiration in the sweating sickness was very offensive.

Murchison, in his great work on the *Continued Fevers of Great Britain*, p. 138, says, under the head of typhus fever: "A peculiar repulsive odor is given off from the body of most typhous patients, after the first week. This smell was noted three centuries ago by Salius Diversus, and has been alluded to by almost every subsequent writer. Lind compared it to the odor of rotten straw, or to the disagreeable affecting scent from a person laboring under the confluent small pox. Gerhard spoke of it as pungent, ammoniacal and offensive. Barrallier likened it to the odor of rotten straw, or that given off by deer, or by certain reptiles, or by rubbing the leaves of rue between the fingers. By other observers it has been more aptly compared to the smell of mice, but perhaps it is more correct to speak of it as *sui generis*. The nurses in the London Fever Hospital are quite familiar with the typhus-odor, and I have known them to distinguish typhus by it alone." The same writer, p. 346, quotes the following from Kelly's report of Relapsing Fever at Mullingar in 1847: "Its smell was peculiar, not fetid or heavy, but somewhat like burning straw, with a musty odor: and, strange to say, there was not a single pauper in the work-house, with whom I had any intercourse, that did not evolve a *similar odor* when heated, even by the slightest exertion."

I have myself several times known patients suffering from suppression of urine whose skin exhaled a strong and unmistakable urinous smell, about this there could be no fancy or mistake. Sensible odors

are also, it is said, imparted to the perspiration by various articles of diet. An alliaceous sweat is perceived from eating garlic, a leguminous (whatever that may mean) from peas; an acid from acids; a fetid from animal food only; and a rancid sweat from fat foods, as is observed in Greenland. Hecker states in his history of the epidemics of the middle ages, that an exclusive diet of fish gives rise to offensive perspiration.

The administration of certain drugs is followed by their peculiar odor in the perspiration; this is particularly the case with sulphur, asafetida, and musk. It must certainly have been perceptible enough in the following example of a celebrated Mohamedan, which is recorded in *Ockley's History of the Saracens*, p. 478: " Abdallah's mother gave him just before his last battle a draught with a pound of musk in it to increase his courage. It is said his head was cut off, and his body hung up, and for several days after they smelled the perfume of the musk he had drunk." Workers in mercury, and those engaged in other metallurgical pursuits, are said to acquire occasionally an offensive perspiration. Further, I may remark with regard to the appearance of various drugs in the perspiration, that Landerer has observed in his own person that after taking large doses of quinine, the sweat assumed the bitter taste of the drug. The following substances enter into and have been detected in the sweat: sulphur, mercury, iodine, iodide of potassium, asafetida, garlic, saffron, olive oil, rhubarb, indigo, prussian blue, and copper. (*Stark's General Pathology*, p. 1127.)

Local bromidrosis is, however, much the most common form of the affection, indeed is very frequently met with, particularly in the form of bromidrosis pedis. The regions of the body which most commonly give rise to offensive perspirations are the axillæ, the perineum and genito-anal region generally, and the feet, especially the inner or contiguous surfaces of the toes. In all these situations the peculiar odor arises no doubt from other sources than the perspiration itself, although it is to be observed that when the odor is specially marked, the perspiration is also in excess. In each of these situations the secretion of the skin has naturally a disagreeable smell, of which even the worst cases of bromidrosis there developed are probably only an exaggeration; this arises in the first two situations from peculiar glandular apparatus, in the third from another altogether special cause. In the axillæ there exist large glandular bodies, which bear a general resemblance in their structure to the sweat glands, but have been termed by some ceruminous glands, from their being still more like those which are found in the external auditory meatus, and secrete the cerumen. The

true character of these organs is doubtful, it being still a matter of dispute whether they should be reckoned among the sebaceous or rather among the sudoriparous glands. The genito-anal region in both sexes is abundantly supplied with a somewhat peculiar and truly odoriferous glandular apparatus.

The cause of the offensive hyperidrosis which so often effects the feet, I believe to be entirely different, and to arise simply from the peculiar treatment to which they are subjected by the fashion of modern dress. I refer to their being habitually and for a large part of the time in nearly air tight boots and shoes, a circumstance that obtains in no other part of the body. We find here none of the glandular peculiarities pertaining to the regions we have just examined, and we do find, what we seldom if ever notice elsewhere, that the epidermis has a most decided tendency to become thickened and sodden when the sweat is at all free, and its superficial layers pass rapidly into a peculiar form of decomposition. All this points very strongly to the conclusion that the maceration of the epidermis, by the impervious character of our foot gear, the high temperature thus maintained, and the decomposition thus produced, are, I will not say the only, but the main factors in the case. Men, and according to my observations those especially who wear boots rather than shoes, are much more liable to this affection than women. Moreover, I never heard of any one who constantly went barefoot, who suffered from stinking feet. Hebra attributed the affection very largely to the constant wearing of the same boots or shoes, and their consequent saturation with decomposing sweat; though there is much truth in this idea, he carried it too far. Of course dirty socks, and other absolute uncleanness, will greatly aggravate, if they do not cause, the trouble. Dr. Longworth, of Cincinnati, gives in the *Clinic*, for October 30th, 1875, the results of some experiments made by him to test the truth of the commonly accepted opinion that the ill odor in this affection is due to the decomposition of the elements of perspiration. Horny epidermis was removed from different parts of the cadaver, including the soles of the feet, soaked in ether three or four hours, and washed thoroughly in water. It was then entirely odorless. Being placed in test tubes with just enough water to cover it, and kept at a temperature of 90° F., the specimens from the various parts behaved differently. Those from the chest and abdomen preserved their transparency, and did not swell up for several days; the fluid, however, became turbid, and had a fetid odor resembling that of bromidrosis. Those from the soles began to swell up within an hour or two, and after twenty-four hours gave out an odor

absolutely identical with that under discussion. Dr. Longworth concludes, therefore, that the odor of the affection is due to the maceration and decomposition of the horny epidermis. In this he is, without doubt, mainly right, but that the materials present in the sweat, added to some unknown personal peculiarities of the individual, have some influence is not to be denied. The odor of this affection has always seemed to me to resemble more than anything else some kinds of strong cheese, and the worst cases I have known were strongly suggestive of Limburger. In addition to the smell, the maceration sometimes goes to such an extent as to produce superficial denudation and even absolute ulceration, especially between the toes; and patients are often rendered absolutely unable to walk from this cause. Although, as we have seen, often associated with abnormal conditions, bromidrosis never seems of itself to be a cause of disease; neither is there any ground for the fear once very commonly entertained that its suppression or cure was liable to result in serious internal mischief. All such fears may nowadays be dismissed as purely chimerical.

Treatment.—We will speak of this under three heads: first, the treatment of bromidrosis universalis; second, of bromidrosis localis; and third, of bromidrosis pedis. The treatment of general bromidrosis consists both of that which is constitutional or addressed to the system at large, and that which may be called local, addressed to the skin. On the first of these heads J. L. Milton, of London, in a little book on the modern treatment of some of the diseases of the skin, published in 1865, has the following remarks: "Rank perspiration is such an offensive affection that every possible care should be taken to get rid of it as soon as possible. Some persons give off, and are yet not aware of it, a most offensive effluvium. Cleanliness, inside and outside, is always necessary. It has been well observed that there are many people who would be shocked at the idea of having a dirty skin, and who yet never think how dirty the inside is, or how much depends on their own exertions for keeping it clean. The great highway of life is left to purify itself. Arsenic has always appeared to me to be the most effectual remedy. Purgatives given two or three times a week and tonics often do a great deal of good, but in an obstinate case I know of no remedy to be compared with arsenic. The Turkish bath should be used once a week; where it cannot be procured a hot bath should be substituted." We may perhaps see in this efficacy of arsenic a reason to believe that this affection, as well as hyperidrosis and anidrosis, is after all virtually a nervous disease, particularly when we recall the fact that all three of these complaints have at times resulted from in-

jury to nerves, and when we remember that herpes, a somewhat allied disease, is now generally regarded as one of the neuroses. Thus we are supplied with another illustration of the fact that to master even one of the least corners of medical science we must take broad general views, and cultivate—what is almost becoming obsolete in the multitude of specialties—the general science of medicine.

After bathing in this disease, if the moisture be excessive the surface may be dusted, after well drying, with rice powder, starch, lycopodium, or some similar substance. If any smell linger after this, free use may be made of chloride of zinc or permanganate of potash. Salicylic acid, either as a powder or as a lotion in solution with borax, might be useful. It is obvious that the common disinfectants which substitute one bad smell for another, are not applicable here. Lotions containing alcohol and astringents are to be recommended; alcohol alone may often be used with marked benefit. The following prescription Duhring says will be found of value: *R. Acidi tannici, ʒj; Alcoholis, ʒ viij. M. S.*—Use as a lotion. Various other astringents may also be employed, such as sulphate of zinc and alum, also salt baths. Frequent washing of the parts with dilute ammonia water has been well spoken of; acetic acid, diluted, will also be found useful in checking the mild forms of the disorder. Washing with the so-called juniper tar soap, has also been well spoken of.

In offensive sweating of the axillæ and genital regions, including the perineum and genito-crural fold, the same plans of treatment will be found applicable. Here, however, the drying and disinfectant powders may be more freely and successfully used; a combination of salicylic acid and powdered soap stone may be thoroughly dusted over the parts after thorough washing and drying. One writer in case of stinking armpits speaks of cutting off the hairs, or, what he says is better, pulling them out, but this seems unnecessarily severe, and I should judge not so infallible as to compensate for its severity. Dr. Bull writes to the *Lancet*, May 8th, 1880, that in a case of bromidrosis of the axillæ, where mineral acids, German mineral waters, and Fowler's solution, together with the local application of carbolic acid in glycerine, extract of belladonna, tannin dissolved in spirits of wine, tincture of iodine, and unguentum diachyli, had been employed in vain, inunctions of ten per cent. oleate of mercury used nightly after washing the armpits with alcohol caused the excessive sweating to disappear and the offensive odor with it.

The most common, annoying, and intractable form of the disease is, however, still to be considered, viz., bromidrosis pedis. Even if we had

no experience, we might infer the obstinate nature of this affection from the multitude of remedies that have been proposed for it. One of the older writers, Dr. Durr, has the following remarks in *Hufeland's Journal*, Vol 9, No. 8.; he says that "he has observed two cases, in which after the cessation of the fluxus mensium, which had appeared rather disorderly and in long spaces of time, a very strong sudor pedum ensued, combined with a most disagreeable smell, which went away by degrees, as soon as the fluxus mensium was re-established; but instead of it an acrimony of the stomach was brought on, which could by no remedies be subdued. Dr. Durr is in general of opinion that in the investigation of chronic diseases of the head and stomach, that circumstance, viz., sudor pedum, is not sufficiently regarded. He relates a case where, after a customary sudor pedum had been expelled by bathing the warm perspiring feet in cold water, the four back teeth of the right side of the maxilla inferior fell out without any other perceptible cause, and without much pain, and an efflux of a puriform matter was occasioned, which lasted a long series of years, till the death of the patient."

The good doctor's reasoning is strictly of the *post hoc ergo propter hoc* kind; but, his observations are curious and I give them for what they are worth. However, we have quoted two cases from Hildebrandt, in a previous section, in which repression of perspiration of the feet was followed by profuse hyperidrosis of the hands, so that we cannot utterly deny some constitutional influence in bromidrosis pedis, strictly local as the affection generally seems to be. But still we need never hesitate to cure this disagreeable affection for fear of bad consequences ensuing; Hebra states that he has never known anything of the kind to happen during a very large experience extending over twenty years, and intimates that the idea has been fostered mainly by those who could not cure the disease and sought a screen for their incompetence. In treating this disease let us, first bearing in mind the opinion of the distinguished dermatologist just referred to, insist that the patient shall leave off wearing any boots, shoes or slippers, previously in use, and change his socks or stockings at least every day, and bathe and thoroughly dry his feet twice in every twenty-four hours. This, together with the use of some of the astringent lotions or drying powders already referred to, will no doubt suffice for many of the milder cases if thoroughly carried out for a sufficient length of time. In addition to this, many other remedies have been suggested of which I will mention a few. Dr. Rumbold, of St. Louis, recommends bathing the feet in warm water for fifteen minutes just before going to bed. The water

should be kept as warm as can be borne, by the addition at intervals of boiling hot water. After the feet are dried and thoroughly rubbed with a coarse towel, an ointment composed of salicylic acid and bromide of potassium, each five grains to the ounce of vaseline, should be applied with considerable friction, and the feet should be covered with a pair of cotton stockings well warmed. According to the *Revue de Therapeutique*, an immediate remedy is found in washing the feet with a solution of chloral, one part to a hundred, and keeping them enveloped in compresses wetted with the same solution. Ortega recommends the same treatment. Dr. Burdon claims to have attained satisfactory results by the employment of a solution of permanganate of potash, commencing with three parts in a thousand. Dr. Gaffard, in the *Edinburgh Medical Journal*, Jan., 1860, recommends a mixture of red oxide of lead, 15 grains, and about one ounce of solution of subacetate of lead as an application, with which the feet are to be bathed every day. Tincture and ointment of belladonna have also been recommended. Dr. Berthold recommends a method which he says is efficacious, and which is less troublesome than that of bathing with solutions. It consists in powdering the interior of the patient's socks with a powder composed of one part of salicylic acid and five of starch. This is, too, an excellent mode of treating the local sweating which in fat persons takes place between the scrotum and the thighs, and which if not arrested is apt to lead to a troublesome eczema.

Kuester employs the following; Salicylic acid, ʒ ij; powdered soapstone, ʒ ss; starch, ʒ ijss; soap, ʒ j. The feet having been thoroughly washed and dried, the powder is dusted over them and between the toes, and some of it is put in the stockings. After two or three applications the bad odor disappeared; the secretion of sweat was considerably diminished in quantity; and in a short time the perspiration ceased entirely, and the result was a permanent cure. In a correspondence with the *Deutsche Zeitschrift für Practische Medicin*, in which journal the above appeared, Dr. Page speaks very highly of the gratifying success he has had with the following powder, viz.

R. Acid. salicylici..... grs. x
 Acid. tannici..... grs. xv
 Talc. preparat
 Pulv. iris florent.....aa ʒ ss. M.

The daily application of this powder between and under the toes, and in the stockings or socks, stopped the maceration of the skin, and fetid odor attending it, and reduced the excretion of sweat to the normal standard.

Dr. F. C. Ainsworth, Assistant Surgeon U. S. A., in the *Medical Record*, for October 2d, 1880, lauds most highly the following powder: R. Pulv. alum. exsicc., ℥ iij; acid. salicylici, ℥ iss-iij. M. It is desirable that the alum should be very thoroughly burned and reduced to an impalpable powder. This he says, when used in the same way we have already directed for other powders, is equally efficient as Hebra's celebrated plan, which we shall describe further on, and much less troublesome.

Panarolus, an old writer, remarking that perspiration of the feet doth very much torment people, continues, "for which I can tell them a speedy remedy; namely, if they put some powder of myrtle into their linen socks; but let them have a care they fall not into worse disease by the cure of this, as I have often seen; for this excretion preserves from many diseases, and should rather be promoted than any way checked."

Foot baths of brine or of a strong solution of alum have succeeded in some cases. The following ointment is much esteemed by Wilson, namely; equal parts of tar ointment and sulphur ointment, to be spread upon clothes and applied with a bandage. Finally, when all other methods fail, Hebra says, "recourse may be had to the following procedure, which will invariably be attended with success. A certain quantity of the simple diachylon plaster (Emp. Plumbi, Emp. Lythargyri) is to be melted over a gentle fire, and an equal weight of linseed oil is then to be incorporated with it, the product being stirred till a homogeneous mass is produced, sufficiently adhesive not to crumble readily to pieces. This is then spread over a piece of linen measuring about a square foot. The foot of the patient being well washed and thoroughly dried, is now to be wrapped in the dressing thus prepared. Pledgets of linen, on which the same ointment has been spread, are also to be introduced into the space between each pair of toes, to prevent their touching one another, and care must be taken that the foot is completely covered, and that the dressing is accurately in contact with the skin. When this has been done, an ordinary sock or stocking may be put on the foot, and outside this a new shoe, which should be light, and should not cover the dorsum of the foot. After twelve hours the dressing is to be removed; the foot is then not to be washed, but must be rubbed with a dry cloth, or some dry and absorbent powder may be applied to it. The dressing is then to be renewed in the same way as before, and its application is afterward to be repeated twice a day. This procedure must be continued for from eight to twelve days, according

to the severity of the case. During this time, however, the patient need not keep his room, but may go on with his business as usual. At the end of this period the dressings and pledgets are to be removed, the foot is to be again rubbed with some pulverulent substance, and the patient may then be allowed to wear his ordinary shoes and stockings. In the course of a few days it will be found that a brownish-yellow layer of cuticle, about half a line thick, is beginning to peel off from all those parts of the skin which were before affected with the disease, and that a healthy, clean, white surface of epidermis is exposed as this substance separates. When this layer of cuticle has become completely detached, the foot may for the first time be washed, but it will still for some time be advisable to dust some pulverulent substance into the stocking, or to rub it into the skin of the foot. After the lapse of a fortnight or three weeks from the first application of the dressing, the hyperidrosis will generally have disappeared, and the cure will last for a year or longer, or may even be permanent. In quite exceptional cases, however, it will be found that a single course of this treatment is not sufficient to effect the complete removal of the complaint. The whole procedure must then be gone through a second time; but this will certainly, and without exception, bring about a cure. I have practiced this mode of treatment for more than twenty years, and in many hundred cases."

Notwithstanding Prof. Hebra's strong declarations of its infallibility, I am afraid this plan is too troublesome to be adopted except in the most severe and rebellious, and otherwise hopeless cases.

Dr. Gay, of this city, informs me that when he was at the Hot Springs in Arkansas, he saw there what was called the "corn hole," being one of the hot wells for which the region is celebrated, in which numerous persons were in the habit of soaking their feet for many hours every day, until their corns were thoroughly macerated, and could easily be pulled out by the roots. He was told that it also cured sweaty feet, which he found on inquiry to be the fact, and since his return home he has cured this affection in many instances, by simply directing the feet to be soaked for hours every day in water as hot as can be borne.

Dr. Nash, also of Columbus, tells me that on the recommendation of Dr. E. B. Stevens, of Cincinnati, he has tried with good results the application of a strong, almost caustic, solution of silver nitrate; but there are obvious objections to this plan which I need not mention.

Dr. Klitzinski, in the *Echo Medicale*, quoted in *Braithwaite's Retrospect*, part 40, p. 151, speaking of Chlorhydric acid, says: "A portion

of the skin wet with this liquid perspires in the same time and under the same circumstances 27 to 30 per cent. more carbonic acid, and, what is remarkable, 7 to 12 per cent. less water, than the same portion not wet." The author concludes, among other things: "It diminishes the uncomfortable sweating of the hands and feet, and causes them to cease entirely, after a long continued use of it. It does not injure the skin in any way if properly used; on the contrary it softens it, and can be regarded as a real cosmetic. When employed it should contain neither iron nor chlorine. It is used as concentrated as the patient can bear it without feeling a burning sensation, and after thirty to sixty seconds, the wet part is washed first with pure water, then with soap and water."

M. Stanislas Martin, *Bulletin de Therapeutique*, Tome 65, p. 143, says: "The diffusion of the abominable odor in this complaint may be effectually prevented by placing a sole containing a layer of powdered charcoal between the foot and the stocking, or between the latter and the shoe. A paste composed of forty parts of powdered charcoal, forty of water, and fifteen of gum should be thickly spread over a piece of felt-ing paper, flannel felt, &c., stretched over a board or pasteboard. The paste is then covered with another piece of paper, which is to be smoothed with the hand so as to remove all asperities. The whole is submitted to compression during an hour, after which the water is to be allowed to evaporate. When quite dry, the sole may be cut out of the required size. Being so cheaply made these soles can be changed once or twice a day if required."

Dr. George Thin, in an article in the *British Medical Journal*, Sept. 18th, 1880, says: "It has been pointed out by Hebra that the evil smell is not in the sweat itself, but in the coverings of the feet; a fact which it is easy to verify. The patient who has afforded me the opportunity of investigating the cause of the smell is a young woman, aged twenty-two, who has suffered from evil smelling feet with soreness of the heels for several years. Her hands are usually moist, or even wet, but are always odorless. The smell from the feet is not constant, disappearing in dry, bracing weather, and reappearing when the weather is moist and depressing. The experiment I made was to subject the soles of the stockings and boots to the action of an antiseptic solution. The success was complete, the odor being entirely banished. The antiseptic precautions being soon neglected, the smell returned, and I took the opportunity of investigating its causes more minutely. The sole of the stocking, a few hours after it was put on, was found to be quite wet; and a stocking, if worn for a whole day, was so extremely offensive

that, when held close to the nostrils, its over-powering fetor was comparable to that of putrid blood. The inside of the boot was equally wet and offensive; but at the very time that the stocking and boot smelt so strongly, the heel itself, exuding moisture profusely, had no disagreeable odor. The sole of the heel was reddened and tender, and macerated round the edge, like a washerwoman's palm. The reaction of the moisture in the stocking and in the sole of the boot was alkaline, that of the moisture exuding from the skin of the sole of the heel faintly alkaline, while that of the perspiration of other parts of the body was acid. The fluid in the sole of the stocking was found to be teeming with bacteriaforms, the nature and development of which I have carefully investigated. The treatment in this case is as simple as it has been effective. The stockings are changed twice daily, and the stocking feet are placed some hours in a jar containing a saturated solution of boracic acid. They are then dried, and are fit for wear again if it be desired. The boracic acid effectually destroys the smell. But to kill the bacteria in the stocking is not enough. The leather in the bottom of the boot is wet and sodden, and smells as vilely as the stocking. This difficulty is got over by the use of cork soles. I directed my patient to get half a dozen, which she finds sufficient. A pair must only be worn one day unchanged; at night they are placed in the boracic jar, and put aside the next day to dry. If these directions be accurately carried out, the evil smell is perfectly destroyed. The boracic acid solution is an excellent application to the painful skin in these cases. When the tender skin of the soles is washed with it, a sensation of coolness follows the feeling of heat and tension which are the usual accompaniments of the eczematous condition associated with the smell, and the skin becomes harder and loses its abnormal redness. The bacteric fluid would seem to act as a direct irritant to the skin. My patient assures me that, if she wears the stockings which have been dried without being disinfected, irritation is speedily felt; and that the cork soles, if worn a second day without having been purified, act in a similar way."

This is a most interesting contribution to our subject, but surely the doctor builds too great an edifice on the foundation of a single case.

Another correspondent writes to the *British Medical Journal* a plan for curing this nauseous malady:—"A plan I always adopt, and have always found successful in a few days (say from seven to fourteen). The feet are washed well over night, and are then enveloped in about a couple of folds of linen dipped in equal parts of hot water and the following:

"R. Zinci sulph.....	3 i
Glycerin.....	
Ac. carbolie	aa 3 ij
Aquam, ad.....	3 viij. M.

"The linen istied on by a couple of pieces of tape, and the patient goes to bed, keeping the feet out at the bottom. This is done night after night, with improvement at once, and the cure in the time first stated. I have known one case in which the disease recurred in two or three months, but quickly yielded to a repetition of the treatment."

Mr. Edgar A. Browne, M. R. C. S., in a paper in the *Liverpool Medical and Surgical Reports*, October, 1870, says that the patients affected with bromidrosis pedis "are usually of the lymphatic type; the nervous system poorly toned, and apt to break down under stress; skin pale, sallow, or muddy—generally thick, loose, tender to external impressions, and liable to acne, eczema, and other diseases of a low type. Sex does not appear to have any influence." These observations have not been borne out by my own, nor are they confirmed by other writers, they seem either to be purely fanciful, or derived from a limited and peculiar experience; and moreover do not accord with his other remarks, to the effect that the smell depends solely on retention of the secretion in the socks. He recommends washing the feet in cold water, and says that, "hot does harm," which again is contrary to the experience of others; he has not added anything to the subject, and is in the main a mere echo of Hebra.

IV. *Chromidrosis*.—Synonyms; *Ephidrosis discolor*; *Chromocrinie Cutanée*; *Dyschromatoderma*; *Colored Sweat*.

Chromidrosis is a very rare disease, though perhaps if we exclude offensive feet and axillæ, not more so than *osmidrosis*. In this affection the excretion of sweat is usually excessive and possesses positive color. The following are the hues that have been observed; (a) *Viridis*, of a green tinge (*Sauvages*, *Borelli*, *Cent.* 2, obs 56, &c.); (b) *Nigra*, of a black tinge (*Sauvages*, *Joel*, *Langelot*, *Collectanea Academica*, 3. 255); (c) *Cerulea*, of a blue tinge (*Sauvages*, *Wincler*, *Collect. Acad.*, 3. 263, &c.); (d) *Rubra*, of a red color (*Sauvages*, *Bartholin.*); (e) *Flava*, of a yellow color; (f) *Fusca*, of various shades of brown. Sometimes special names are given to these different forms, as *cyanidrosis*, *melanidrosis*, &c. Of the various colors, yellow is the most rarely met with, except when it occurs as a complication of jaundice of which we shall speak further on; the next rarest is the green, unless it occur from copper poisoning of which we shall have some interesting cases to relate.

The commonest hues presented by this chameleon disease are black, brown, and blue, the blue being generally of a dull dark shade, often so dark as to be rather what may be called a blue black; sometimes, however, it is a real azure hue. The coloring matter in these three forms is probably identical, being most likely indican, which is, as it normally exists, colorless, and occurs pathologically in human urine. The indican is believed to be secreted by the sweat glands in a colorless state, and to be acted upon by the air so as to be oxidized blue, or brown, or blackish, as the case may be. In one case which Scherer examined, the patient had been taking a large quantity of iron, and Scherer found the blue color to be due to protosulphate of iron. It may be proper to remark just here that in the cases of blue pus, blue milk, and blue bile and urine, which have been reported from time to time, some salt of iron, generally the prussiate, has been found to constitute the coloring matter. The red coloring matter of the urine, uroerthrin, has been found in perspiration by Landerer; a blue coloring matter allied to cyanin has been found in the sweat. As already observed, the coloring matter of bile, and various salts of copper, may be present, and impart to the cutaneous transpiration their peculiar hue; whether any other coloring principles besides those I have mentioned have been found in this secretion, I do not know.

As in bromidrosis it is necessary to bear in mind that in this disease we have to do with the totality of the secretions from the skin—the *materia perspiratoria*—and some authors have insisted that the so-called colored sweat is in most cases more truly a colored sebum, of the nature of that in *stearrhea* or *seborrhea nigricans*, more or less diluted it may be with the true perspiratory fluid. No doubt this is sometimes the case, but we have the testimony of respectable authors that it may be observed as an oozing of sweat, more or less profuse, coming directly from the opening of the ducts and possessing the properties of normal sweat plus the peculiar coloring matter. The disease occurs most commonly in women, and is much more frequent in unmarried than in married women. It is usually, but by no means always, encountered in connection with uterine disorders of one kind or other; and particularly in that mysterious condition known as *hysteria*. It has often been simulated, and this possibility should always be borne in mind in investigating a case of this kind, and every precaution taken lest we be made the victims not only, but the agent also of ridiculous or interested deception. In this proneness to attack the nervous and hysterical we find another of those links which we have been

tracing all through our general subject, connecting the anomalies of perspiration with the sympathetic or vaso-motor nerve system.

The amount of secretion in chromidrosis may be very slight, or excessive in quantity. As a rule the flow is not constant, but appears suddenly, remains for a short time, and then disappears again. It may come and go in this manner for a period of weeks or months. It is frequently brought on by excitement, emotion, or passion; fright is often mentioned as a cause, although it may appear without any exciting cause.

As far as I know it is never universal; various regions may be attacked, but it has been noticed most frequently upon the face, chest, abdomen, arms, hands, and feet; the lower eyelids and cheeks seem to be its most favorite seat.

Dr. Bleifuss (Wurtemberg, *Med. Correspondenz Blatt*, 1835, No. 26) has seen blue sweat from the foot of a patient with disease of the abdomen. Michel has likewise observed it in an hysterical woman and in a hypochondriacal man; it was most marked on the right side of the body. Billard (*Floriep.*, *Notizen*, 32) observed a blue sweat on the upper part of the body of a girl, and Conradi reports blue perspiration of one half of the scrotum.

It has long been known that in certain rare cases of jaundice the perspiration, particularly in the axillary regions, is deeply tinged with bile. Wood says, *Practice of Medicine*, Vol. 2, p. 515; "All the other secretions are occasionally more or less tinged with bile, especially the perspiration which often stains yellow a towel rubbed upon the skin." Flint, *Practice*, p. 547, says: "The perspiration contains the coloring principles of bile, and the body linen may be stained yellow, especially from the abundant cutaneous secretion in the axilla." Roberts, *Practice of Medicine*, p. 657, says: "Evidence of the presence of bile is often afforded by the sweat, milk, saliva, and tears." Niemeyer says, "bile pigment constantly occurs in the sweat also, so that the linen is colored yellow, particularly at those parts where the patients sweat much. The milk of nursing women has also been found colored yellow." Murchison, *Clinical Lectures on Diseases of the Liver*, remarks: "The cutaneous glands usually eliminate the pigment, and sometimes in such quantity as to stain the linen yellow, but the amount discharged in this way is small when compared with that which escapes through the kidneys." Frerichs, in his classical work on *Diseases of the Liver*, says: "Next to the kidneys, the sweat glands take the most prominent part in the excretion of bile pigment. Not unfrequently the secretion of the axillæ, and of other parts of the skin remarkable for their secre-

ting properties, colors the whole linen distinctly yellow." Chomel was acquainted with this symptom, and Cheyne observed a patient who first became cognizant of his complaint from noticing his towel become yellow upon wiping his face. Andral describes a case in which the sweat colored the linen yellow, and the urine contained the coloring matter of the bile, although the skin and conjunctivæ exhibited no jaundiced tint. Finally, under this head, Dr. J. Wickham Legg, in a recently published work on Diseases of the Liver, &c., states that this symptom was known to Galen, though it is only said by him, however, that the sweat is bitter. A similar Xanthidrosis, according to Dr. Geo. B. Wood, *Practice*, Vol. 1, p. 515, is observed in yellow fever; he says: "All the other secretions are occasionally tinged with bile, especially the perspiration, which often stains yellow a towel rubbed upon the skin." Other writers concur in the same statement.

Having mentioned the appearance of colored sweat as one of the symptoms of poisoning by copper, I will now proceed to cite some of the cases in which it has been observed. Dr. Clapton (*Medical Times and Gazette*, Vol. 1, 1868, p. 658) has put on record a number of cases of copper poisoning occurring amongst the out-patients of St. Thomas' Hospital, London. In these cases the copper had been taken into the system with the food, or by work people in the course of their accustomed occupations. One was a sailor, who had been compelled, during the whole time of a long voyage, to drink lemon juice, which was kept in a copper tank. Another was a young woman, an artificial flower maker, who was in the habit of inhaling the dust of verdigris and Scheele's green, which she used in her business. A third case, a coppersmith in an engineer's factory, led to the discovery that all the persons working in a particular shop, fifteen in number, were similarly affected. The general symptoms induced by the copper, which were of a chronic character, were: vertigo, gastrodynia, flatulence, dyspnea, frequent vomiting, wasting of the body, coppery taste, lassitude, and indisposition to exertion; the tongue moist and flabby, and pulse hard and full. In all there was a green tinge of the edge of the gums extending half way up the tooth. The perspiration of these people had a bluish tinge. "I examined the flannel waistcoats of several and found them deeply stained, especially under the arms. One of the men stated that, even after a hot bath on Saturday night, the white shirt next day, if in hot weather, would be quickly discolored. I noticed, too, that the wooden handles of all the hammers were stained green from the perspiration of the hands. Even with the greatest care it is impossible to prevent the inhalation of copper particles or

fumes. The dust of the shop, when viewed in a bright ray of light, can be distinctly seen to be charged with bright metallic particles. Water, too, kept in any vessel in the room for a short time can be shown by tests to be charged with copper. The fumes given off during the process of strongly heating the copper for the purpose of joining appear to be most injurious."

In a case of green perspiration recorded by M. Pritchard, of Leamington (*London Medical Gazette*, Vol. 2, p. 211, 1833) the cause was ascertained to be the accidental exhibition of copper with the food, the food having been prepared in a copper vessel plated with tin, from which a portion of the tin had been rubbed away. The subject of the affection was a young lady of fourteen, who "had for some months evinced much general debility." She was then "seized with an attack of rheumatic fever, which yielded to remedies slowly and unsatisfactorily. After some days, during which the perspiration was considerable, my attention was called to a collection of light green perspiration between the toes, and underneath the nails of the young lady's feet, whilst the same appearance was observable in a fainter degree on the upper, but more especially the under surface of the foot."

So far we have only mentioned instances in which the sweat was discolored by the elimination of coloring matter derived from well-known poisons taken into the system, or retained in the blood; let us now turn to those cases which come more properly under the head of true or idiopathic chromidrosis, though even here we shall almost invariably find some concomitant pathological condition. I have stated already that the disease is a very rare one, in confirmation of which I offer the following quotations, from those who have had the largest opportunity for observation, and whose authority in such a matter is both undisputed and indisputable. Erasmus Wilson says, "I have never seen a case deserving of being considered as one of chromidrosis." The following is absolutely all that Hebra has on the subject, in his work on diseases of the skin. I quote the section entire as it is very short. "No instance of this affection having come under my observation, I can only quote the description of it given by other writers. Thus Rayer states that cases occur in which the sweat is of different colors—green, black, blue, or yellow,—but he confesses that he himself has seen none of these varieties. Fuchs says that cases have been observed in which, sometimes over the whole body, sometimes at particular spots, the cutaneous secretion has been yellow, green, blue, brown, or black. Besides staining the linen, the perspiration dried on the skin of the persons thus affected into a colored powder, which, however, could

easily be scratched off, the heathy skin beneath being then exposed. Erasmus Wilson also admits that he has seen no instance of this affection."

I am myself acquainted with a middle-aged man, whose axillary sweat is distinctly and deeply colored, leaving a stain on his under-clothing over the region indicated as large as the spread hand, which is of a deep fuscous orange color; and a few years ago I knew an elderly lady the perspiration over several regions of whose body stained her clothing of a dark brown, and was a source of deep mortification to her. Both of these persons are, as far as I know, in good health, and neat and cleanly in their personal habits.

In regard to red perspiration in the axilla, a number of communications have appeared in the *Medical Record* during the year. The first is in the number for May 15th, 1880, in the department headed Progress of Medical Science, p. 540, as follows:—"At a meeting of the Swedish Medical Society, Prof. Alex Key reported the case of a colleague who had for sometime noticed that the hairs in his axillæ adhered together, and that this was occasioned by a sticky substance covering the hairs. *The perspiration from the axillæ stained the shirt red*, but occasioned no other inconvenience. On close examination, Key found the hairs roughened and sticking together, and many of them were covered with a yellowish coating resembling honey. The latter was situated on the free ends of the hairs and formed partly isolated or confluent intumescences, partly rosary, chain-like globules, or a coherent mass surrounding the hair. There were no changes in the skin. The microscopic examination showed that this condition depended on a peculiar fungous vegetation which by transmitted light had an amber-yellow color. At its commencement the vegetation appeared as a small, thin, glistening lamella, of a pale yellow hue, which soon formed small globular elevations of homogeneous appearance in the main, but with numerous imbedded small glittering spores. The flakes seemed to lie in part on the surface of the hair, in part and predominantly the vegetation pressed in between the outer layers of the epidermic plates of the hair, giving the latter a roughened appearance. Again and again the vegetation could be followed as far as the medulla of the hair. No mycelium was discovered. No mention of a similar case could be found in special literature." In the next week's issue of the same journal (May 22d, p. 580) is a short communication from Dr. W. A. Dayton, 131 W. 125th St., as follows: "Sir:—The extract in your last issue entitled 'Red Perspiration of the Axillæ,' brought to mind several cases which I have seen within the past two years. In each instance the patients

were afflicted with pediculi pubis, and the axillæ were inhabited. The hairs in the armpits were invariably matted together with the 'honey' secretion, and microscopic examination revealed what might, in truth, be called 'glittering spores.' At first I concluded that the honey secretion was a sebaceous matter, but now am quite sure it bears some relation to the nutrition of the ovi, as in the case of spiders' eggs. As for treatment, a little soap and water will *prevent*, or a little blue ointment will *cure*, any case where there is red perspiration of the axillæ." This writer's short communication involves a most unwarrantable assumption, and, take it all together, I am rather surprised it should have found a place in any scientific journal. The following appears in the *Record* for July 10th, 1880; it is rather ambiguous in its import, if not rash in its assertions. It is from Dr. W. C. Moore, of Eldora, Iowa, who says:—"The cases of this condition are very common. Few, if any, fleshy people are exempt, although it is not by any means confined to this class. The axilla is seldom inhabited without the hairs of the pubis being similarly affected. Its chief cause is lack of cleanliness, and the trouble is easily cured by means of mercurial ointment, compound zinc ointment, or carbolic soap and water." Finally, in the issue of October 30th, 1880, Dr. H., of Savannah, Georgia, writes p. 502:—"I noticed in a recent issue of the *Record* a short article on Red Perspiration of the Axillæ, in which are the words, 'the perspiration from the axillæ stained the shirt red, but occasioned no other inconvenience.' As I am subject to this red perspiration of the axillæ, and suffer no other inconvenience whatever, I can corroborate the above statement. The description of the state of the hairs in the article referred to, corresponds exactly to the condition of mine. But a strange feature in my case is that although I always perspire a great deal every summer, saturating my undershirt at least once daily since the first of June, as well as I can remember, it is *only occasionally* that my shirt is stained red at the axillæ; and I think that this is more likely to occur if I take an unusual amount of exercise, such as a long walk out of town, or rowing. In the *Record* of May 22d, p. 580, is another article on the same subject, by Dr. W. A. Dayton, in which he says:—"In each instance the patients were afflicted with pediculi pubis, and the axillæ were inhabited.' Now, on this point I think the doctor is entirely mistaken, and as far as my own case is concerned I *know* he is mistaken, as I never yet had to support a family of pediculi pubis, and I have been subject to the red perspiration of the axillæ for several years. Another fact which induces me to believe that Dr. Dayton is mistaken in regard to the cause of this affection is that in my case I have never

known this red perspiration to occur except in summer, while I am inclined to think that in this climate (perhaps also in others,) the pediculi pubis will affect persons in winter as well as in summer. Although I have while hunting been perfectly covered with perspiration in the middle of winter, yet I have never noticed a red stain or the peculiar condition of the hairs at that season. As to the treatment, I have not as yet given it a thought, but I find that a liberal and daily application of soap, for weeks continued, has not removed that peculiar condition of the hairs; and from the fact that I have been in the habit of using soap and water liberally and daily winter as well as summer, I *know* that their use has not prevented the affection in my case, but it has prevented the hairs in the armpits from being invariably matted together with the honey-like secretion. If this affection was produced by a sticky substance covering the hairs, this substance would impart its stickiness to the perspiration, and through it to the fabric of the shirt, but I have not found this to be the case. Although I have not made a microscopical examination of the hairs thus affected, I am inclined to think with Dr. Key, that the affection is due to a peculiar fungous vegetation."

We cannot accept the conclusions of any of these writers, at least only in a few and exceptional cases. The Swedish Professor's fungus needs to be seen and examined by others; indeed, his description of it supplies serious doubts as to its being a fungus at all. Dr. Dayton's inference, whatever may have been its value in the particular cases he saw, it is absurd to apply to others. In this connection it is well to remember that the axillary sebaceous glands are so peculiar, that some have called them ceruminous, and I may repeat that Landerer has found the red coloring matter of the urine (uroerythrin) in the axillary sweat of a fever patient, so that the explanation of this red axillary perspiration may not be such a simple matter after all.

Delthil (*La France Medicale*, March 24th, 1877, p. 186) reports a case of chromidrosis occurring in a girl sixteen and a half years old. Around both orbits and various parts of the body were discolorations of a blackish blue hue, which stained the clothing and were evidently the product of a natural secretion. The appearance of this secretion was intermittent and did not correspond with the catamenial epoch. A peculiar phenomenon presented itself, viz., the falling off of the nails, all those of the right foot were already gone, while those of both hands and other foot were tender and appeared as if about to fall off. The patient menstruated regularly, and was in good health with the exception of a slight nasal catarrh. Some spots of purpura were to be seen at

times. The gums were painful, bled easily, and were spongy. The girl had had urticaria and measles, but she presented, more especially, some of the phenomena of hystero-epilepsy in which the crisis sometimes lasted for two days. These crises were accompanied by a peculiar form of hyperesthesia, so that the hairs appeared as rigid as those of an electrified animal, and the simple touching of the hair follicles provoked an erethism with hystero-epileptiform convulsions. In conclusion, Delthil asks if chromidrosis is a true morbid entity, if the phenomena described have not an analogy to scorbutus, ergotism, and different other affections characterized by an alteration in the function of the vaso-motor nervous system.

I quote the following from *Braithwaite's Retrospect*, Part 13, p. 308:—"In the last Volume of the *Medico Chirurgical Transactions* (Vol. 28, p. 611), Mr. Teevan has recorded a wonderful case: the patient, a girl fifteen years of age, was the subject of this remarkable discoloration. It was first observed in January, 1845, on the left under eyelid and internal angle of the eye. It was at first of a brown color, but soon became black, and spread over the forehead and eyelids of both eyes. The black secretion thus formed could be washed off, and was sufficient to discolor a large quantity of water; when it was being secreted, there was a burning heat in the parts, and so decided was this that she could tell within a quarter of an hour when the blackness would show itself. It invariably commenced in the same situation, and spread as noticed above. Mr. Teevan states that he has no knowledge of the physiological cause of the disease; the secretion he considers analogous to melanosis. There is no other case of a similar description on record." There is room here for just the ghost of a suspicion that Mr. Teevan may have been imposed on, and surely he is a little hasty in saying there is no similar case on record.

Among recent writers on this curious and rare disorder, may be mentioned Dr. G. Camuset, in *Le Mouvement Medical*, 1870, p. 419. According to Camuset, the affection is almost always observed in women, and manifests itself by a slate-black discoloration of the skin in various regions, chiefly the lower eyelids. Sometimes it extends to the middle of the cheek, and to the upper lids, symmetrically on both sides. It has been observed on the chest and elsewhere in localities where the sweat glands are abundant. The exudation is composed of an amorphous, blackish substance, of strong coloring powers, like soot. Under the microscope the fragments look like bits of dried varnish. This material is derived from the glomeruli of the sudoriparous glands: it has nothing in common with the pigment of the rete Malpighi. The

color of the material varies in intensity in different cases, and according to the condition of the individual. It is worse at the menstrual period. The affection may last from a few months to several years, with occasional intermissions and remissions. It leaves the lower eyelids last of all the localities attacked. Young women are most usually the subjects of chromidrosis. Treatment is to be directed against the general debility accompanying the affection. Dr. Camuset gives notes of the case of a young girl of feeble health, who presented the eruption in its typical form. She was cured by the use of tonics, &c. It is sufficiently obvious that this author writes of only one form of chromidrosis, and from a very partial and imperfect knowledge of the affection.

The following case is reported by Dr. C. D. Purdon, of Belfast: "Barbara Murphy, aged 40, mother of two children, inmate of an infirmary at Belfast. For twenty years she has been the subject of various affections, mainly of a rheumatic character, with heart complications, anasarca, and hydrothorax. About the time of the report these troubles which had been much better returned with such severity as to threaten her life. When at the worst, a miliary eruption appeared on the trunk, greatest in the epigastric region, from which a clear serous discharge flowed in such quantities as literally to wet the bed; there was a great moisture on the legs, which had blisters on them in place of the miliary eruption; this was attended with the greatest relief, and the breathing became almost free. The discharge continued for some days, after which it ceased, and symptoms of dyspnea returned with great severity for fourteen days, when after having a sense of prickling over the whole body for twelve hours, the eruption again appeared, attended with the discharge, and causing the same relief. In this state of alternate relapse and recovery she had been for the last two months, the duration of the paroxysms being either eight or fourteen days. But the most curious point in the case is, that the serous discharge has changed very much in character for the last four or five attacks, being alternately nearly blue and straw colored or yellow, almost like pure bile. When the blue discharge appears she is aware of its advent by a mouldy smell, and a prickly sensation which precedes it invariably for twelve hours; the yellow is not attended by either of these. The blue always appears along the posterior part of the chest; the yellow generally proceeds from the abdomen and back of the neck, and rarely from the back; the blue never has appeared on the abdomen; the two colors have been produced from different parts at the same time. The discharge from the extremities has never been colored. In place of catamenia there is a discharge of reddish green color. As to treatment,

every remedy has been tried without relief to any of the symptoms, either of the rheumatic or cardiac affections. The yellow color is tolerably permanent, the blue, however, fades; she has not taken any preparation of iodine for some years, and at present uses only opiates and saline draughts." *Dublin Quart. Jour. Med. Sci.*, quoted in the *Medical Examiner*, Jan., 1840, p. 67. In this extraordinary case it seems highly probable that, notwithstanding the concomitant appearance of certain eruptions, the cutaneous discharge was mainly perspiratory in character.

The following are some further cases and authorities on this curious and interesting subject. Cases have been recorded by Billard, in the *Archives Generales de Medicin*, see *Cyanopathie Cutanée*; Neligan, *Dublin Quarterly Journal*, 1855; Barenprung, *Le Roy de Mericourt*, who has written a *Memoire sur la Chromidrose ou Chromocrinie Cutanée*; Gintrac, Lecat, Gallot, Bousquet, Banks, Lyons, Macken, Gilbert, Robin, Kollman. Dr. Foote, in the *Dublin Quarterly Journal*, 1868, in a good paper on chromidrosis, has given the particulars of thirty-eight cases. Other writers are, Lemery, *Histoire de l'Academie des Sciences*, 1701; Fontenele, sur les *Suems bleues*, *Journal de Chemie-Medicale*, Vol. 1, p. 330. Maker, of Kirchberg, *Gaz. des Hopitaux*, 1859, quoted in *Canstatt's Jahrbuch*, Vol. 3, p. 322; and many more.

Tilbury Fox remarks with good judgement:—"In all cases of chromidrosis it is the first duty of the physician to see that he is not being cajoled." Indeed, as might be expected from the class of patients in whom the phenomenon has been most frequently observed, it has frequently been made the subject of attempted, and no doubt also of successful deception. And when we remember the consummate and untiring cunning of these hysterical women, we need not wonder that it should sometimes baffle even professional skill and sagacity. Billard and Neligan regard the disease as altogether a simulation, and in a case referred to by Duchenne, a woman avowed that she had painted her face during a period of twenty years to simulate the disease. I take pleasure also in referring to an excellent paper by James Startin, Esq., F. R. C. S., in the *British Medical Journal*, Jan. 8th, 1870, on "Feigned or Hysterical Diseases of the Skin." One of his cases was that of a young hysterical female in the middle ranks of life, who spoiled a large amount of linen in consequence of a profuse perspiration of a dark or black color; this, says he, "I found to be a solution of soot in milk or tea, which opinion was confirmed by my esteemed friend, M. Jonathan Hutchinson, whom I asked to put a portion of the linen under the microscope."

Treatment.—Of the treatment of this disease there is, indeed, very little to be said. It resolves itself almost entirely into the treatment of concomitant or accompanying conditions. In the yellow sweat of jaundice, we have to treat the jaundice, or rather the condition of which it is a symptom. For the green sweat of metallic poisoning, the *sine qua non* is the removal of the cause, and subsequently such means as will favor the elimination of the poison and the restoration of the patient's bodily functions and powers. In the cases which are associated with uterine and hysterical symptoms in the female, and hypochondria in the male, the indication is plain enough, but often exceedingly difficult of accomplishment. And when we consider the capricious and chronic character of the ailments, our hopes for speedy cure cannot be very sanguine. It would be a mere waste of time to enumerate individual remedies, as they must be adapted to the peculiarities of each case, and nobody, as far as I am aware, has ever suggested anything as having a specific virtue in chromidrosis.

Perhaps, in addition to the general remedies here suggested, warm water and soap, or some alkaline or detergent wash like borax, with the subsequent use of some of the stimulating and astringent lotions spoken of under the head of hyperidrosis, might be of value.

V. *Hematidrosis.*—Synonyms: Hemidrosis; Diapedesis; Dermæthemorrhæis; Ephidrosis Cruenta; Sudor Sanguineosa; Sudor Cruentus; Bloody Sweat.

This rare affection, which has always excited in a high degree the interest and attention of medical observers, consists essentially of a hemorrhage from the unbroken surface of the skin. But inasmuch as this hemorrhage takes place from the network of capillaries which surrounds the sudoriparous glandule and makes its appearance through the aperture of the sweat duct, it is not inappropriately after all spoken of as bloody sweat, and its various synonyms which stand at the head of this section. The discharge is generally intermittent, or at least remittent, and paroxysmal in its nature, the intervals varying from a few hours to months. Sometimes it is pure blood, which coagulates in crusts or gouts upon the surface, sometimes it is so intermixed with serum or the perspiratory fluid as to be merely a more or less deeply colored bloody liquid. Its amount varies extremely; it may make its appearance over the whole or nearly the whole of the cutaneous surface, but more commonly it is confined to some selected regions, generally those in which the integument is thin and delicate. It most fre-

quently appears as a more or less copious and continued oozing from the surface, which when wiped away, rapidly or slowly reappears from numerous minute or indistinguishable points, but it has been seen to spring up in a distinct jet from the surface. It is often associated with eruptions upon the surface of an erythematous or vesicular character, but quite as often there is nothing of the kind. Every age, and both sexes have furnished examples of it, though it is most common in females, and especially nervous and hysterical women who are affected with some menstrual irregularity. It sometimes appears to be vicarious of the menstrual function. Bloody sweat may be produced by overwhelming mental emotions, and marks the acme of such perturbing passions as terror, anguish, despair, &c. In these cases and some others it appears to be the result of a purely nervous impression. While in others, as in malarial fevers, of which it has been known to form a complication, the immediate cause is of a somewhat different nature. While in some cases it has been associated with scurvy, purpura, and other blood dyscrasiæ, this has not generally been the case. It has been simulated, chiefly by enthusiastic and dishonest pietists. Examples of the affection may be found extending throughout the whole range of medical literature, as well modern as ancient, and from a collection of these we shall probably be best able to study it, and bring into view its numerous and varying phases. And if it should be claimed that it is a matter of very little practical importance, at least no one can doubt its interest.

CASE 1. The eminent French historian, De Thou, mentions the case of an Italian officer who commanded at Monte-Marò, a fortress of Piedmont, during the warfare in 1552 between Henry II. of France and the Emperor Charles V. This officer, having been treacherously seized by order of the hostile general, and threatened with public execution unless he surrendered the place, was so agitated at the prospect of an ignominious death, that he sweated blood from every part of his body.

CASE 2. The same writer relates a similar occurrence in the person of a young Florentine at Rome, unjustly put to death by order of Pope Sixtus V. in the beginning of his reign, and concludes the narrative as follows: "When the youth was led forth to execution, he excited the commiseration of many, and through excess of grief, was observed to shed bloody tears, and to discharge blood instead of sweat from his whole body; a circumstance which many regard as a certain proof that Nature condemned the severity of a sentence so cruelly hastened, and invoked vengeance against the magistrate himself, as therein guilty of murder."

CASE 3. Among several other examples given in the Ephemerides, of bloody tears and bloody sweat occasioned by extreme fear, more especially the fear of death, may be mentioned that of "a young boy who, having taken part in a crime for which two of his elder brothers were hanged, was exposed to public view under the gallows on which they were executed, and was thereupon observed to sweat blood from his whole body."

In Millingen's Curiosities of Medical Experience we have the following account of this disorder, with illustrative cases. "But of all the maladies that affect cutaneous transpiration, diapedesis, or sweating of blood, is the most singular; so much so, indeed, that its existence has been doubted, although several well authenticated cases are on record, both in the ancient and modern annals of medicine. It is mentioned by Theophrastus and Aristotle, who says, some have sweat a bloody sweat, and again, some through an ill habit of body have sweat a bloody excrement. And Diodorus Siculus says of the Indian serpents, that if any one be bitten by them, he is tormented with excessive pains, and seized with a bloody sweat. Galen observes: *Contingere interdum, poros ex multo aut fervido spiritu adeo dilitari, ut etiam exeat sanguis per eos fiatque sudor sanguineus*. While Lucan thus describes it:

'Sic omnia membra

Emisere simul rutilum pro sanguine virus.

Sanguis erant lacrymæ; quacumque foramina novit

Humor, ab his largus manat cruor; ora redundant,

Et patulæ nares; sudor rubet; omnia plenis

Membra fluunt venis; totum est pro vulnere corpus.'

The detestable Charles IX. of France sunk under this disorder, thus described by Mezeray (Historie de France, Vol. 3, p. 306): 'La nature fit d' étranges efforts pendant les deux dernières semaines de la Vie de a Roi. Il s'agitait et se remuciet sans cesse; le sang leei rejalliait par les pores et par tous les conduits de son corps. Apres avoir long-tems suffert, il tomba dans une extreme faiblesse et rendit l'ame.' The same historian relates the case of a governor of a town taken by storm, who was condemned to die, but was seized with a profuse sweating of blood the moment he beheld the scaffold. Lombard mentions a general who was affected in a similar manner on losing a battle. The same writer tells us of a nun who was so terrified when falling into the hands of a ruthless banditti that blood oozed from every pore." (Schenck, apparently referring to this same case, says that she died of hemorrhage in the sight of her assailants.) "Henry ab Heer re-

cords the case of a man who not only labored under diapedesis, but small worms accompanied the bloody secretion." (Probably vermicular coagula formed in the sudoriparous ducts.) "In the memoirs of the Society of Arts of Haarslem, we read of the case of a sailor who, falling down during a storm, was raised from the deck streaming with blood. At first it was supposed that he had been wounded, but on close examination, the blood was found to flow from the surface of the body. Fabricius de Hilden mentions a case that came under the observation of his friend Sporlinus, a physician of Bale; the patient was a child twelve years of age, who never drank anything but water; having gone out into the fields to bring home his father's flocks, he stopped upon the road, and contrary to habit, drank freely of white wine. He shortly after was seized with fever. His gums first began to bleed, and soon after a hemorrhage brook out from every part of the integuments, and from the nose. On the eighth day of the malady he was in a state of extreme debility, and the body was covered with livid and purple spots, while every part from whence the blood had exuded was stopped with clots. A case is also related of a widow forty-five years of age, who had lost her only son. She one day fancied that she beheld his apparition beseeching her to relieve him from purgatory by her prayers, and by fasting every Friday. The follow Friday, in the month of August, a perspiration tinged with blood broke out. For five successive Fridays the same phenomenon appeared, when a confirmed diapedesis appeared. The blood escaped from the upper part of the body, the back of the head, the temples, the eyes, nose, the breast, and the tips of the fingers. The disorder disappeared spontaneously on Friday, the 8th of March the following year. This affection was evidently occasioned by superstitious fears; and this appears the more probable from the periodicity of the attacks. The first invasion of the disease might have been purely accidental; but the regularity of its subsequent appearance on the stated day of the vision may be attributed to the influence of apprehension. Bartholinus mentions cases of bloody sweat taking place during vehement terror and the agonies of torture.

"The case of Catherine Merlin, of Chamburg, is well authenticated, and worthy of being recorded. She received a kick from a bullock in the epigastric region, that was followed by vomiting of blood; this discharge having been suddenly stopped by her medical attendants, the blood made its way through various parts of the pores of her body, every limb being effected in turn. The sanguineous discharge was invariably preceded by a prickly and itching sensation; frequently this itche-exudation proceeded from the scalp. The discharge usually occurred

twice in the twenty-four hours; and on pressing the skin, the flow of blood could be accelerated and increased.

"Dr. Fournier relates the case of a magistrate who was attacked with diapedesis after any excitement, whether of a pleasurable or a painful nature."

The following explanation of the phenomenon, which Milligen gives, is probably nearly as good as any that we can offer at the present day.

"It is probable that this strange disorder arises from a violent commotion of the nervous system, turning the streams of blood out of their natural course, and forcing the red particles into the cutaneous excretories. A mere relaxation of the fibres could not produce so powerful a revulsion. It may also arise in cases of extreme debility in connection with a thinner condition of the blood."

CASES 14 and 15. In his Commentaries on the Four Gospels, Maldonato refers to a robust and healthy man at Paris who, on hearing sentence of death passed on him, was covered with a bloody sweat. Zachias mentions a young man who was similarly affected on being condemned to the flames.

CASE 16. The following case is quoted in the *Medico Chirurgical Review*, from the French Transactions Medicale for November, 1830. "A young woman, aged twenty-one years, irregular in menstruation, and of indolent habits, and obstinate temper, had been much irritated by some reflections made by her parents on account of her abjuring the Protestant religion. She left her paternal roof, and after wandering about for some time, took up her residence in a hospital. She was then suffering violent attacks of hysteria, attended with general convulsions, and exquisite sensibility in the pubic and hypogastric regions. After paroxysms of hysteria, which sometimes lasted twenty-four or thirty-six hours, this female fell into a kind of ecstasy, in which she lay with her eyes fixed, sensibility and motion suspended. Sometimes she muttered a prayer, but the most remarkable phenomenon was an exudation of blood from the cheeks and the epigastrium, in the form of perspiration. The blood exuded in drops, and tinged the linen. The cutaneous surface appeared injected in those parts whence the blood escaped, being red, and showing a net work of arborescent vessels. This bloody perspiration took place whenever the hysteric paroxysm lasted a considerable time. This state continued for three months, and ultimately gave way, it is said, to local bleeding, together with strong revulsive measures.

CASE 17. J. C. Schilling relates the case of a boy, twelve years of age, who was relieved from a severe comatose and convulsive disorder by a bloody sweat, which broke out August 2d, 1747.

I take the following note on this subject from Dr. Schneider in Casper's *Wochenschrift*, 1849. "It has often been a question whether, under any circumstances, blood is ever mixed with the fluid of perspiration in human beings. Dr. Schneider remarks that he has several times observed the phenomenon. He mentions having been once summoned to a healthy man, fifty years of age, who, for a period of twelve months in succession, had travelled on foot, during the journey he had perspired much in his feet; and, on examining them at the end of it, they were found covered as high as the ankles with a sanguineous perspiration, which had also soaked into and stained his stockings. In another case of a healthy young man, Dr. S. mentions having noticed that, after violent exercise, the perspiration beneath the arms was of a bright red color; and he quotes a similar case from Hoffman. In proof that the perspiration over the whole body may also be of a sanguineous character, he mentions one case in which it had been observed in a delicate man after copulation, and then quotes the following still more remarkable case from Paulini: While surgeon on board a vessel, a violent storm arose, and threatened immediate destruction to all. One of the sailors, a Dane, thirty years of age, of fair complexion and light hair, was so terrified that he fell speechless on the deck. On going to him, Paulini observed large drops of perspiration of a bright red color on his face. At first he imagined the blood came from the nose, or that the man had injured himself by falling; but on wiping off the red drops from his face he was astonished to see fresh ones start up in their place. The colored perspiration oozed out from different parts of the forehead, cheeks and chin; but was not confined to these parts, for, on opening his dress, he found it formed on the neck and chest. On wiping and carefully examining the skin, he distinctly observed the red fluid exuding from the orifices of the sudoriparous ducts. So deeply stained was the fluid, that on taking hold of the handkerchief with which it was wiped off, the fingers were made quite bloody. As the bloody perspiration ceased, the man's speech returned; and when the storm passed over he recovered, and remained quite well during the rest of the voyage."

Erasmus Wilson, in his work on Diseases of the Skin, mentions two cases which had come under his own observation, and refers to three others, he says:

CASES 22 and 23. "I once saw a young lady, in whom a discharge of this nature took place every fortnight from four circular spots, each about the size of a half crown, and situated symmetrically on the face, one being on each cheek, one on the forehead, and one on the chin:

And more recently I have seen another young lady of highly nervous temperament, whose face would become in a few hours covered with blotches of blood without any lesion of the surface. When I sponged away the blood the skin looked congested and erythematous."

CASES 24, 25, and 26. A young woman of eighteen suffered a loss of blood from her ears, a little after at the points of her fingers, and then at her toes; presently after, at the umbilicus and corner of her eyes; several times by sweat; and at length it burst out from the middle of her breast; afterwards in the foot, where the saphena vein is pricked in bleeding; then at both palms and back of her hands. Two days after it flowed from the chin, and in the night time from the tip of her tongue, and all this in a fortnight's time. Whenever it flowed from her breast or other parts like sweat, there was no vestige of an orifice to be seen.

M. Du Gard has recorded the case of a child three months old, that was taken with a bleeding at the nose and ears, and in the hinder part of the head, which lasted for three days, and afterwards the nose and ears ceased bleeding, but still the blood-like sweat came from the head. Three days before the death of the child, which happened the sixth day after it began to bleed, the blood came more violently from its head, and streamed out to some distance. It also bled on the shoulders and at the waist. It also bled for three days at the toes, at the bend of its arms, at the joints of the fingers, and at the fingers' ends.

Voigtel also has noticed an instance of sanguineous perspiration. Mason Good remarks, that ephidrosis cruenta, which he defines as cutaneous perspiration intermixed with blood, has taken place occasionally during coition; sometimes during vehement terror, and not unfrequently during the agony of hanging or the torture. It is said also in some instances to have occurred in new-born infants, probably from the additional force given to the circulation, in consequence of a full inflation of the lungs, accompanied with violent crying.

CASE 27. The following case is recorded by Dr. J. Parrott, in the *Gazette Hebdomadaire* for 1859. "Madame X. was born in 1832. The father expired from a nervous affection, but her mother enjoyed good health. At the age of seven months the patient received some wounds on several fingers of the right hand, which wounds cicatrized only after a lapse of two years. In her sixth year she suffered, without any apparent cause, from convulsions, with loss of consciousness, two or three times a month; afterwards the scars would bleed, without any cause, and without pain. One morning bloody tears appeared after a fit of anger, and since then bloody perspirations were occasionally ob-

served on the knees, thighs, the chest and the lower eyelids. With the appearance of the menses, at the age of twelve, these manifestations decreased for a time in frequency, but soon returned with greater vehemence. The face became often quite suddenly covered with blood. These bloody sweats always followed physical emotions, and were accompanied with nervous disturbances, a loss of sensibility and mobility. The patient was married at twenty-five. The convulsions grew more frequent at first, disappeared during gestation, but returned after delivery, with a hemorrhage. During the year 1858 Mrs. X. felt much better, until she got sick in consequence of sitting up at night with her child. On the first of April she was attacked by a swoon and convulsions, the face appeared covered with blood, and heavy pains through the abdomen, thighs, and head distressed her. Dr. Parrott, being called, found very frequent convulsions, with bloody perspirations on different parts of the body. Spanish-fly plasters to the most painful parts, inhalation of chloroform and large doses of opium gave some relief, and on the 20th day of May the patient was allowed to go to the country. She returned in five days. The menses made their appearance several days beyond the regular time. May 25th, at 4 P. M., the patient was attacked by pains in the sides, breast, the hypochondriac and epigastric regions; in a short time a bloody perspiration on all these parts followed, with epileptic fits; on the front part of the head there was a regular circlet of blood drops, and blood also exuded from below the cilia on the lower eyelids. Neither before nor after the exudation did the skin present any abnormal appearance. Relief was afforded by large doses of morphine; the monthly discharge established itself and ended the trouble. September 28th, pain and bloody sweat over right side of the face, with epileptic fits; no menstrual discharge. On the 18th of November, headache, convulsions, blood all over the face. The next day ejection by the mouth of about two spoonfuls of arterial blood, with heavy pains and bloody perspiration in the epigastric region. January 25th, again disturbed menstruation, epileptic fits, pains, bloody sweats; the next day almost mania, every paroxysm terminating with vomiting, spasm of the glottis, and somnolence; the pains and exudation of blood continuing. Towards evening regular flow of the menses, cessation of all other symptoms. Two days afterwards, the menses becoming disturbed, hematemeses, tetanic convulsions and bloody perspiration set in again. Between the paroxysms this patient appeared perfectly healthy and her intellect unimpaired; she presented nothing of the mental depression so common in epileptics."

In connection with this case, Dr. Parrott cites five other observations of a similar character. Friederich Hoffman, *Opera Omnia*, Geneva, 1748, noticed blood sweating following the suppression of fluor albus in a hysterical patient; Boerhave, *Comment in Aphorismi*, Paris, 1765, saw a similar secretion in a girl also suffering from hysterical complaints; Caizergues, *Annales Clinique de Montpellier*, 1814, observed sanguineous sweats in a woman of thirty years, and Chauford in a girl of twenty-one; finally Prof. Magnus Huss refers, *Archives Generale*, 1857, to a girl twenty-three old as being a bleeder; but Parrott considered this case as belonging to hematidrosis. In Boerhave's case only the right side of the body was affected, in Dr. Huss's patient the left side. In an article on this subject in the *Cincinnati Lancet and Observer* for July, 1861, from which the above cases were taken, the author, Dr. C. A. Hartmann, remarks:—"Sometimes there are no premonitory symptoms; at others a great excitement precedes the exudation. The paroxysms are either irregular, depending only on the nervous derangement, or they manifest a periodic type. Their duration varies from a few hours to several days. Females are particularly subject to hematidrosis, but the disease appears to be limited to the years of youth. Among the predisposing causes are enumerated the irritable temperament, angry disposition, mental exertion, sitting up during the night, moral impressions." These observations, good enough as far as they go, are evidently founded on a very partial survey of the subject, and cover only a part of this strange and many sided disorder.

CASE 33. The following remarkable case is related by Hebra, in his work on Diseases of the Skin. "The patient was a young man, strong and well nourished, who was attackèd repeatedly by hemorrhage from the surface of the lower limbs. This generally occurred during the night, so that he first became aware that the bleeding had taken place by finding the sheets stained with spots of blood when he awoke. I once, however, saw blood flow from the uninjured back of the hand of this patient while he was sitting near me at table. The blood formed a jet, which would about correspond in size to the duct of a sweat gland. This jet had also a somewhat spiral form and rose about 1mm. above the surface of the skin."

CASE 34. A. Franque, in the *Wurz. Med. Zeit.*, 1863, No. 4, p. 73, records a case of hemorrhagic sweat occurring in a hysterical female aged 45, whose catamenia were regular. The bleeding ensued three times after long continued severe convulsions, produced by mental emotions. On the fourth occasion Franque himself was present. The

patient suffered for some days previously the most violent pricking pains along the vertebral column, in the left ear, the forehead and the left arm. After the convulsion had lasted an hour there broke out all over the whole body a copious sweat, which appeared red at the parts which had been the seat of pain, and derived its color from actual blood containing red globules. The convulsions and the pains now gradually ceased. As the skin appeared unbroken, Franque presumes that the hemorrhage took place from the sweat glands.

CASE 35. The following is a part of a clinical lecture, delivered at St. Mary's Hospital, by Dr. Thomas King Chambers, and published in the *Lancet* for March 2d, 1861, p. 207. The patient is described as short and stout, twenty-seven years old. She has suffered much from headache and dyspepsia. She has only menstruated twice, and that in consequence of the application of leeches to the uterus; and at or immediately after the last period (three and a half years since) the peculiar symptoms from which she suffered first appeared. She feels first a peculiar soreness and tenderness of an isolated spot, which enables her to predict that in the course of a few hours an eruption is going to commence. The first appearance of this is an erythematous blush, sometimes slightly raised above the surrounding surface, but not so much as in erysipelas. After an uncertain time, seldom more than a few hours, there may be detected a scattered crop of fine vesicles, like sudamina, mixed with a fine serous dew, uncovered by any pellicle. This never lasts long enough to form colorless drops, for quickly it becomes blood stained, and then little points of blood are seen oozing out, sometimes so slowly as to dry and form a scab, sometimes collecting into great thick gouts, and trickling in a ghastly way down her face. The eruption runs through its stages quickest when she is in bed, and especially during sleep. Suspecting from the strangeness of this story that there was some collusion, I had the bed watched, and the nurse saw the blush come, and the blood ooze out in the manner described, while the patient was fast asleep. If rubbed, washed with water, or otherwise interfered with, the bleeding is much increased and prolonged; but if left alone to dry in a scab, it stops in a week or ten days, usually, however, to be succeeded, before it is quite recovered, by a similar eruption in another place. Sometimes, at irregular periods, there was an interval of a week or a fortnight; sometimes the cutaneous phenomena were replaced by bleeding from the nose, sometimes by vomiting of blood, but never by hemorrhage from either lungs or bowels. These symptoms continued nine months, and were relieved by anticipating the eruption of blood with leeches applied to the spot

where it was expected. The discharge became serous, then was like little blisters, and finally ceased, when her health was reestablished by the sea air of Margate. She continued well until last September, when she was admitted here as a mild case of erysipelas of the face. It really looked exactly like erysipelas; but it puzzled us a good deal when it began to bleed, and has continued to puzzle us ever since, as regards its nomenclature, pathology, and treatment. She was seldom seen free from cutaneous hemorrhage from that period till four weeks ago, but it has varied a good deal in violence. During this attack, the face has not been the only part affected. When she lies down much in the day, that, indeed, is almost always the locality where it has appeared; but when she is about, the legs and thighs have exhibited like appearances; both forearms, too, and once the chest, were attacked. The loss of blood, however, was less than on the brow. Examined under the microscope, the fluid exuding from the skin contained blood discs in a natural state—blood discs with roughened edges and shrunken, much granular matter, dark fatty looking specks, and scales of epidermis. It did not coagulate into rolls. Blood drawn from a prick in the finger looked perfectly natural, and coagulated into rolls, leaving the usual number of pale globules free. She has twice thrown up from the stomach about half a pint of dark brownish-purple sanguineous fluid, and I have occasionally seen her pocket handkerchief stained with blood reported to have come from the nose. She states that she has been hysterical for the last year, and has had occasional paroxysms of crying and low spirits during her residence here, but with that exception there are no visible disorders of the bodily functions. The action of the bowels is free, the urine pale and sufficiently copious, the appetite small, especially for meat. But in spite of the little she eats, the constant loss of blood by the disease, and a persistence in a very lowering treatment, she has got very fat—pale, it is true, and flabby, but decidedly fat,—and not weaker in muscular power than on admission. In the last month, during which her ailment has been declining, she has been less hysterical, and had somewhat more appetite. She tells me that a similar increase of flesh occurred during her last illness, three years ago. There is no leucorrhœa, and examination per vaginam fails to detect anything abnormal in the parts that can be explored with the finger. She complains of pain and becomes hysterical during the process. The lungs and heart appear quite healthy.

"This appears to me a case of cutaneous hemorrhage, or, in homely Saxon, 'bloody sweat,' vicarious to suppressed menstruation. Some physicians have fancifully attributed to suppressed menstruation every

kind of increased secretion or congestion which accompanies the derangement of uterine functions, and the female public are still more disposed to endorse this imaginative pathology. I am far from agreeing with them, and would restrict the explanation to those cases where a flow of blood from a distant part not organically diseased follows (*follows*, not *precedes*) a defective condition of the catamenia, and where this flow of blood is a relief to the previous symptoms, and not weakening to the patient. The most frequent forms under which this vicarious menstruation occurs, are hematemesis, epistaxis, hemoptysis, and hemorrhoidal flux, instances of which you may fairly expect to see in the hospital during pupilage; but it is a chance if any of us see again a case where the discharge occurs through the external skin, and it behooves us therefore to seize the opportunity of taking note of the phenomena. My opinion of its rarity is formed on the difficulty I have experienced in finding records in authors who write on allied subjects. I suppose since the invention of printing very few examples of so strange a thing can have escaped being put into type; yet Haller, in his exhaustive work, can only cite eighteen from the industrious collectors of physiological curiosities during a century and a half. After him, Van Swieten, Commentaries on Boerhave Sec., 1286, quotes a case from Boerhave's MS. remains, of a young girl who from her twelfth year menstruated through an eruption of pustules in various parts of the surface, which pustules after the menstruation, entirely disappeared. Pinel, in his *Nosographie Philosophique* in 1802, repeats Haller's collection, but evidently cannot then cap the cases with any later ones at all to our purpose. In Hufeland's *Journal de Practischen Ascarkunde*, there is mentioned a woman who menstruated through of an abscess at the navel at her proper periods for two years; and a girl is said to have told a Mr. Gutgesell, that her menses always appeared through a red spot over her knee. In the *Archives Generale de Medicine*, 1829, t. 19, pp. 212 and 236, are two cases recorded, one of a young lady, who, after ten years suppression, menstruated for three years through a vesicular eruption in one finger; a second of a prostitute, in whom the discharge occurred through spots of the size of a five franc piece, which appeared from time to time one after another on the breast, in the axilla, on the back, the buttocks, and the epigastrium. This is called by the term I have used, 'bloody sweat,' and the description accords closely with that of our patient, especially in the eruption being less periodical, and more continuous than happens in most vicarious menstruations. The uterus also was healthy, for she became pregnant and bore a child. In 1836 I find a rather fuller ac-

count of a case related in Schmidt's *Jahrbucher*, by Heusinger. The woman had diseased ovaries and recto-vesico-vaginal fistulæ, and though sometimes the catamenia appeared at the proper place, they were generally arrested there, and appeared in a variety of parts of the external skin. The most common part was, as with our patient here, the face. She had suffered five years, and been in several hospitals. Heusinger says that she was so hysterical that she would have made a capital subject for mesmerism; whether he means that he suspected her of imposture I cannot say. M. l'Heritier, in his *Traite Complet des Maladies de la Femme*, Paris, 1838, cannot add any case from his own knowledge, but he quotes one recorded by M. Gardien, as reported by M. Brule, of a young girl with suppressed catamenia, who had periodically monthly hemorrhages from vesicles on the legs for six months, from an eruption on the left arm for a year, through a sore on the thumb for six months, by the upper eyelid for two years. This last was preceded by erysipelas, as was also an eruption of the same nature by the navel. She had also hematemesis and other vicarious hemorrhages not to the present purpose. Curiously enough, this identical case is again repeated by M. Briere de Boismont, and said to be quoted from Pinel's *Medicine Pratique*, but I cannot find it in that author's works at all. It is doubtless our old friend of l'Heritier, who also again turns up in Meisner's *Diseases of Women*, and there gets made into two persons by having her history quoted separately from each author. The last named learned and valuable work adds no instances from contemporary observation of menstruation by the healthy skin; and I believe the same may be said of more recent authors. The chatty Meigs and the judicious West do not seem to have seen it. The literature of the subject is scanty simply because the number of patients is scanty; and I cannot say that I have learned anything new from books which this one case had not already taught, though they have given me the satisfaction of agreeing in almost all points of doubt. With their help, and the case before us, I think the following conclusions may be arrived at:—

"1. Cutaneous menstruation occurs in robust and healthy looking rather than anemic persons. It appears, in fact, to be a plethora.

"2. It may occur without any detectable disease of the parts of generation; instance this girl, the prostitute mentioned in the Archives, who had a child, and Mr. Gutgesell's case who was going to be married.

"4. The catamenia are not necessarily entirely diverted from their usual channel.

"5. Periodical cutaneous hemorrhage is not necessarily connected

with the catamenia at all. Thus Van Swieten quotes from Beneventus the case of a man, who once a month sweated a great quantity of blood from the healthy skin of his right flank. It is not always periodical.

"8. Cutaneous menstruation usually appears in the shape of a slightly swelled erythema, painful and tender, on which vesicles form; the vesicles quickly burst, and there is poured forth a sero-sanguinolent exudation, which then becomes bloody, and continues to exude like a bloody sweat for various times, from four days to a fortnight. No scar is left, but the skin is slightly discolored for sometime afterwards in the parts affected.

"10. Bloodletting is the most efficacious treatment; and it is most efficacious in the form in which it is known to produce its most powerful physiological effect—namely, in small repeated doses, and as close as possible to the seat of action—that is, on the spots affected. The measure of the good effect of the bloodletting is the relief experienced by the patient without loss of strength. No other remedies are as yet known to be of any advantage."

CASE 44. The following case is taken from a volume of Lectures on Clinical Medicine by Dr. McCall Anderson, published in 1877. "On the 5th of May, 1866, at the recommendation of Dr. J. Lindsay Mason, of Ayr, I was consulted with regard to a young lady, who, although fifteen years of age, had the appearance of being a couple of years older. I am indebted to Dr. Mason's description of her case for many of the details which follow. Menstruation became fully established at the early age of eight, and continued regularly until she was eleven years old, when it ceased entirely. At the age of thirteen it reappeared, and continued normal until the middle of February, 1865, when it again became irregular, and about this time Mr. Holdern, of Ayr, was requested to see her on account of a large abrasion of the cuticle in the middle of the right cheek, suppurating in the centre, and inclining to bleed toward the circumference. This sore was exceedingly obstinate, refusing to yield to the constitutional and local treatment resorted to. In the summer of this year she went to England, the sore being unhealed, and the menstruation very irregular. The cutaneous manifestations seem to have subsided in the month of October, coincident with which she began to menstruate regularly each month, the discharge on each occasion being profuse, and lasting about six days. In March, 1866, Dr. Mason was requested to see her again, owing to a fresh outbreak of the eruption; and from this time onwards until I saw her in May the menstruation was very irregular, that is to say, she menstruated for one day every week for four weeks, the discharge being, how-

ever, very scanty, after which a fortnight elapsed before the next menstrual flow, and then the weekly discharges reappeared again for another four weeks, and so on. The only parts of the skin implicated from first to last were the face, arms, front of the chest, and legs.

"When I saw her I was struck by the arrangement of the round patches of eruption which were left in the sites of the hemorrhagic attacks. One was on the brow, another on the chin, and one on each cheek. On the front of each arm also there were four in a row, two on each upper arm, and two on each forearm. When the chest was the seat of the eruption, the patches also occurred in a row in front of the sternum. It will thus be observed that the symmetry of the patches was wonderfully perfect, pointing very conclusively to the constitutional origin of the complaint. The patches were oval or rounded; some of them resembled erythema, while others were covered with crusts due to the dessication of serum, blood, or pus, and resembled eczema. One of the most marked peculiarities of the hemorrhage was the suddenness of its invasion. She sometimes exclaimed, 'Oh, I feel another place on my face again,' and *immediately* the hemorrhage set in. One day, when Dr. Mason was dressing a patch of eruption on her face, she suddenly called out, 'Oh, I feel a place on my arm.' He at once turned up her sleeve, and sure enough a large oval patch, fully two inches in length and one in breadth, was detected on the left forearm. Each outbreak was accompanied by a burning pain, and for some time after the development of a patch, especially when they were on her arms, the part was very sore, but never itchy. An oval or round red ring, varying from the size of a shilling to that of a crown, formed almost instantaneously, and the redness quickly spread inwards over the enclosed skin. As soon as seen, the patches appeared as if the cuticle had melted away, and the surface was quite wet. Sometimes the exudation was like water at first, and changed into blood; at other times, and especially on the face, the patches were at once covered with a complete dew of blood. The hemorrhage did not, however, consist merely of the dew of blood; that was only the outset; it was actual bleeding as from a cut, the blood sometimes streaming down the face or other parts attacked. Sometimes, instead of blood, there was only a serous discharge, ending in suppuration. Those patches which bled most healed soonest; but before they healed (which generally took place within five or six days) both suppuration and hemorrhage often occurred in the same place. In exceptional instances the parts did not heal for four weeks. This was especially observed on the chin. No trace of the previous eruption was left after it healed up, ex-

cept on the right cheek, where suppuration was free and prolonged, and where a slight cicatrix was left, although not sufficient to cause deformity. At first she had not the slightest warning that an outbreak was at hand, but at the later periods of her illness Dr. Mason 'observed her lean her head upon her hands, and wear an almost anxious look; and on questioning her she said she felt rather giddy, and in a quarter of an hour, or less, another place would break out.' There was rarely more than one attack each day, although sometimes the hemorrhage occurred from two separate portions of skin simultaneously. It is very curious to note, too, that the outbreak generally occurred at the same hour each day—namely, at 11 A. M.; but it did not seem to be under the influence of mental or bodily excitement, or to be induced by taking food or stimulants. Occasionally it occurred in the afternoon, and sometimes a day passed without an attack.

"While still suffering from this complaint, she had a severe attack of whooping cough, which seemed greatly to aggravate the patches on her face, causing them to bleed freely. At this time also she had frequent and copious epistaxis, generally after a fit of coughing or retching, and this somewhat relieved the parts attacked. This young lady was a rather excitable person, but her general health was good, and the bloody discharge was not sufficiently profuse to weaken her.

"The treatment which was adopted was the maintenance of free action of the bowels with aloes and iron pills, especially when there was any menstrual flow, at which times she sat for about an hour in a hot mustard hip bath, and had a few leeches applied to the insides of the thighs. Locally, when the hemorrhages occurred, the parts were bathed with cold water, and afterwards dusted with powder of oxide of zinc. Dr. Mason also combined with this the administration of Fowler's solution, which she had been getting before I saw her, and which, at all events, did no harm; although I was rather opposed to it on theoretical grounds, as being apt to produce congestion of the skin, and to favor the outbreaks. Within a fortnight of the commencement of the treatment directed against the disorder of menstruation, there was manifest improvement, and Dr. Mason reported that by the beginning of June the cutaneous manifestations had quite disappeared, and no traces of them were left, except the slight scar previously referred to, and slight redness of the previously affected parts if she got overheated or excited. About this time, however, she had on one occasion a slight discharge of blood from the eyes. Her menstruation, although considerably improved, was not well established. On the 27th of October, 1866, Dr. Mason reported that she remained 'quite free

from her old and troublesome complaint,' and that her menstruation was pretty regular, though not quite up to the mark; and on the 19th of May, 1867, he reported, 'The young lady is now quite well, and has been so since I wrote you last.'"

At the conclusion of his narrative of this case Dr. Anderson goes over pretty much the same ground we have already traversed, giving no new case, and adding nothing material to the subject. He mentions Chambers' case at some length, most of those referred to by that writer, and draws a similar series of conclusions from his survey of the subject.

An exceedingly interesting case was reported by Dr. Hart in the *Richmond and Louisville Medical Journal*, January, 1875, p. 98, which I have not been able to obtain.

CASE 46. The most recent case that I have found is the following from an informal Report of the Proceedings of the King William County, Virginia, Medical Association, by Geo. Wm. Pollard, M. D., and published in the *Virginia Medical Monthly* for Jan., 1880, p. 816. "Among a number of interesting cases reported at the last meeting of the King William County Medical Association, was one by Dr. R. G. Hill, of bloody sweat, the subject being a boy four years of age, suffering from malarial fever. During each sweating stage, blood oozed from the face and neck. Febrifuges, followed by quinine, afforded relief; but two months later he was taken with hemorrhage from the alimentary canal. This condition was accompanied with both vomiting and purging of blood, from which he died. No autopsy."

One at least of the lower animals, the hippopotamus, sweats blood, when brought to this country and kept in a state of confinement, as I myself have witnessed; the instance thus seen occurred during hot weather in late summer.

As already stated, sweating of blood has been simulated by religious enthusiasts, the following interesting example of which is taken from Hebra. "More than ten years ago there lived in a village not far from Vienna a woman who was said to take neither food nor drink, and who asserted that every Friday, between the hours of ten A. M. and noon, hemorrhage occurred spontaneously from her skin at various points, but especially from her face, feet, and hands. The parts were, in fact, said to be the same from which blood flowed during the crucifixion of our Lord. Now, as this occurrence created a great sensation in the neighborhood, and attracted numerous pilgrims from all parts of the country, the authorities found themselves compelled to make a thorough investigation of the matter. Dr. Haller, a physician who held a high position in the General Hospital at Vienna, was sent to the

spot, with the necessary staff of police, in time to place the woman under surveillance on a Thursday, and to bring her before the Friday to Vienna. Here she was placed in a room, so that she could be watched uninterruptedly, night and day, by medical men. The Friday came, and the woman did not bleed. She, however, took nothing that day nor till the evening of Saturday, when, tormented by hunger, she asked for food, and ate a considerable quantity. From this time she took nourishment regularly, and the hemorrhage never recurred. The case just related is probably similar to not a few others, which are recorded in the history of spontaneous hemorrhages (under the name of *stigmata*), but which were never brought into the clear light of scientific investigation, so as to be examined without prejudice and—*explained*." These impostors, the so called *stigmata*, still make their appearance from time to time in Catholic countries, as may appear from a recent publication, which bears the following extended title-page: "Letter from the Earl of Shrewsburg to Ambrose Lisle Phillips, Esq., descriptive of the *Estatica* of Caldasa and the *Addolorato* of Capsiana; being a second edition revised and enlarged; to which is added the Relation of Three Successive Visits to the *Estatica* of Monte Sansavino in May, 1842. First American, from the last revised London edition; with Additional Letters now first published; bringing the Narrative down to 1842. 'It is Honorable to Reveal and Confess the Works of God.'—Tobias, xii., 7. New York, 1843." In this publication fifty similar cases are adduced, which are said to have received the attestation of the church. Of those with which the book itself is concerned, one is said to eat nothing but a little fruit; of another it is asserted:—"Indeed, she may be truly said to subsist upon air; for on the fifteenth of August next it will be *eight years complete since she ate, drank, or slept!*" Where is Dr. Tanner after this? It is a noteworthy fact that these cases were all those of poor peasant girls, in secluded, out-of-the-way hamlets, amongst a rustic and ignorant population; they were plainly hysterical and cataleptic; visited by hundreds of wondering, half adoring spectators, who were ready to fall down and worship them. We have here everything that could stimulate and aid deception; everything but the "clear light of scientific investigation," to which Hebra's case was subjected.

With regard to the so-called bloody sweat of our Saviour, such an undoubted article of faith to many, and so familiar to our ears in the pathetic invocation of the Episcopal Church, "by thine agony and bloody sweat," the celebrated Dr. Mead makes the following observations in his *Medica Sacra*: "Saint Luke relates of Christ himself that

when he was in an agony by the fervency of his prayers, his sweat was like drops of blood falling down on the ground. This passage is generally understood as if the Saviour of mankind had sweated real blood. But the text book does not say so much. The sweat was only *hosei thromboi aimatos*, as it were, or like drops of blood; that is the drops of sweat were so large, thick and viscid, that they trickled to the ground like drops of blood. Thus were the words understood by Justin Martyr, Theophylactus, and Enthymius." Among modern commentators, some agree with Whitby, who says, "I own that these words do not certainly signify that the matter of this sweat was blood, but only that it was like to blood, being in such large drops." But the majority hold with Alford, that it was a veritable bloody sweat. Adam Clarke contends that the passage must be interpreted according as the emphasis of the passage is made to rest on *thromboi*, or *aimatos*, and unhesitatingly declares for the latter. Perhaps it would be better not to add anything to the judicious and non-committal remarks of Dr. Mead, but still I will hazard the following considerations. It is difficult to understand why, if Luke, a clear writer and said to be a physician, wished to state the fact of a bloody sweat he could not have done so in plain straightforward language, with no ambiguity about it. If he was, as it is said, a physician, the simile of dropping blood, not an unnatural one in any case, for profuse sweat, would be all the more natural and likely to be used. In the gloom of the garden the color would not be noticed, though the profuseness of the sweat as its falling proved might; furthermore, if it had been blood it would have left stains, if not crusts or coagula behind it, and excited still further notice and remark. From all these considerations I think we have reason enough to conclude that this bloody sweat exists only in the affectionate and pious fancy of the church; derived during the darker ages when men would rather believe than examine, and left undisturbed even to these times when, alas! men would, as a rule, rather examine than believe.

Treatment.—The cases of hematidrosis detailed in this section have said for me all there is to say on the subject of treatment. This is obviously never directed against the condition itself, but to the general condition of which it is a symptom or concomitant. Malaria, purpura, and scorbutic or other cachectic conditions need their well known remedies. Where the complaint is a symptom of suppressed or irregular menstruation, to this function and the nervous system attention must be mainly directed, and what little experience there is on the subject seems to show that judicious bloodletting is more to be relied on than the tonic treatment now so fashionable for everything.

Since writing this section I have seen a newspaper account of a boy aged fourteen years, in Chicago, who has, it is said, been sweating blood at intervals for seven years. The hemorrhage in his case is preceded by an erythematous eruption; he has also hemorrhage from various mucous surfaces. No doubt a more detailed and reliable account will make its appearance in the medical journals in due time.

VI. *Galactidrosis*.—Synonyms: *Galactorrhea erronea*; *Sudorlacteus*; *Milchschweiss*.

This is the heading of a section in Hebra's work on Diseases of the Skin, which reminds me of a celebrated chapter in a certain history of Iceland, entitled "The Snakes of Iceland," the contents of which are as follows: "There are no snakes in Iceland." I am not without a fear that the reader of this will visit the same criticism upon me, be it so, I will write what I have to write nevertheless, quoting first the section from Hebra to which I have referred.

"Under these names there are described, especially in the older works, certain diseases of lying-in-women, said to be caused by a metastasis of the milk, sometimes to one of the internal organs, sometimes to the skin. So long as the puerperal diseases of the uterus, ovaries, &c., were not known, all maladies arising after childbirth were referred to a "metastasis" of the milk. In the last century Van Swieten, Levret, Selle, and others gave minute descriptions of affections of various organs supposed to be produced by retrocession of this secretion. But now that pathological anatomists are familiar with the morbid changes which occur in the puerperal state, and that chemistry and the microscope have made clear the composition of the milk, no one any longer fancies that this secretion is liable to metastasis, and that he sees it exuding from the swollen axillary glands of a woman recently confined (Siebold), or from her nose after violent sneezing (Fleischmann, *Hufeland's Journal*, 1836, part 6). Puerperal affections are at the present day regarded as pathological processes arising from a special cause, but not as differing in any essential respect from inflammatory and suppurative diseases produced by other conditions. As a further proof that there is no such thing as a metastasis of the milk to the skin, I may state that no one of the many physicians who have attended in the lying-in hospital of Vienna (in which there are, on an average, 8,000 births annually) has ever seen milk exude from the skin, although epidemics of puerperal fever have carried off many victims. Nor again, have any of the physicians engaged in our school of pathological anatomy (who find material for their world renowned labors in thousands of post-mortem examinations) ever found occasion to dem-

onstrate a metastasis of the milk in the dead body. I think, therefore, that I am justified in expressing the doubt whether any diseases have ever arisen from this cause, and in regarding galactidrosis as an affection altogether mythical."

The writer in the *Encyclographie des Sciences Medical*, Bruxelles, 1845, says:—"Are there milky sweats? This question is not yet answered; though many authors formally deny their existence, nevertheless it is well known that in icterus the elements of the biliary secretion are found in the liquid exhaled from the skin. Why may it not happen that milk may appear during the fever of those newly delivered? It would be interesting to verify this analogy. I have spoken of urinary sweats observed in recent times in subjects affected with retention of urine, and to-day all doubts have been removed by many observers; according to them the odor characterizing the affection of which we speak comes from the arrest of the excretion of urine. This is extremely fetid, and rapidly infects the clothing of the patient, and gives to the whole body the odor in question. According to these authors the sweat contains the elements of the urine reabsorbed as the result of their prolonged sojourn in the bladder. I repeat this is an interesting question to verify."

The following case of a man who had a Vesicular Eruption on the Abdomen, which discharged at times great quantities of a chylous fluid, was reported to the British Medical Association, August, 1870, by Wm. Roberts, M. D., of Manchester. The patient was a clogger, aged forty-five. Two and a half years previously he suffered for six months from a succession of abscesses in various parts of the body. One of these was situated in the hypogastric region, and about the site of this—after it had healed—there arose an eruption of vesicles which gradually extended over nearly the whole of the lower half of the skin of the abdomen. These vesicles at first contained a serous fluid, but afterwards this assumed a milky appearance. Some of the vesicles were as large as peas; others as small as pins' heads. Sometimes the eruption was quite dry for days and weeks; but some half a dozen of the largest vesicles often discharged immense quantities of milky fluid. This fluid coagulated spontaneously; it contained albumen and finely divided fat; also cells resembling the pale blood corpuscles. This eruption remained—sometimes dry and sometimes discharging—without much change for a period of two years. No local appliance or internal remedy availed anything. The patient finally became tuberculous and died. The skin of the abdomen was removed after death, and it was found that the disease was situated in the cutis vera and the subjacent

connective tissue; the altered part appeared to consist of a network of short channels or lacunæ, lined with spheroidal gland cells. These communicated with each other and with their vesicular expansions on the surface. This man passed chylous urine on two occasions, but no anatomical changes could be discovered in the urinary passages. The lymphatic glands in the groin and the lymphatic vessels were unaffected, and the lacteal system had no connection whatever with the eruption. Reference was made to the cases of Dr. Buchanan and Dr. Carter, and the bearing of the case on chylous urine pointed out.

In an interesting work on Occlusion and Dilatation of Lymph Channels, by Samuel C. Busey, M. D., of Washington, D. C., published in 1878, we find several instances of a milky exudation, though not from perfectly healthy skin nor from the sweat ducts. In one case, in which there was enlargement of the left labium in a woman aged thirty, it is related: "On the forenoon following her admission the discharge reappeared, and it was seen that the labium became more tense, and that at several places, without visible lesion of the skin, minute milky drops exuded, which after being enlarged rolled off. The dried remains of these drops formed a yellowish-white scab." The reporter of this case, Prof. W. Petters, of Prague, says. "In many discharges looked upon as milk secretion by the older physicians, there may have been a mistake of lymph for milk. Thus, the milk sweat observed by Dr. Storch in a woman aged thirty, parturient for the fifth time, which continued for eleven days, and was accompanied by milky lochia, was very likely only a lymphorrhagia." This is no doubt the origin of galactidrosis, which has then after all a foundation in facts, only the facts were ill-observed, and not properly understood.

VII. *Urinidrosis*.—Synonyms: *Uridrosis*; *Sudor urinosus*; *Ephidrosis arenosis*; *Ephidrosis sabura*; *Harnschweis*; *Urinous Sweat*; *Sandy Sweat*.

Curious cases are recorded of a sandy sweat, in which the evaporation of the watery elements of the perspiration leaves a crystalline or amorphous deposit upon the skin. Bartholinus, Schunig, and Mollenbrock, among the older physicians, have related several cases of the kind. This condition is generally associated with suppression of the renal secretion, and the solid matter deposited upon the skin has been found to be more or less rich in urea or uric salts, thus showing a true vicarious relation between the kidneys and the perspiratory emunctories; it is then a true *urinidrosis*. But it is also possible, as intimated by Mason Good, that solid particles, the residuum of evaporated sweat,

may be deposited upon the skin from other causes, he remarks, "at times the more solid particles of the materials employed in handicraft trades are absorbed by the lungs, and thrown forth upon the surface. Among glass blowers, from the large quantity of sea salt that enters into their manufacture, the sweat is sometimes so highly impregnated that the salt they employ and imbibe by the skin and lungs has been seen to collect in crystals upon their faces." That this may often take place is no doubt true, and reasonable enough, and yet we should remember, that these saline particles in a state of fine division are disseminated through the atmosphere in which they work, and the appearance referred to may be in part at least due merely to their settling upon the surface.

Murchison, in his work on the continued fevers of Great Britain, has the following, p. 138. "Convalescence (in typhus fever) is sometimes ushered in by moderate perspiration, while death is often preceded by copious sweats, giving a sodden appearance to the skin. The secreted fluid has an acid reaction, but in two severe cases I have found it alkaline. In several cases, for the most part fatal, I have found that, on evaporation, it left a white efflorescence upon the eyelids and face consisting of oval shaped and stellate crystals, composed of a free acid, fatty matter, and a large proportion of chlorides. Barrallier makes a similar observation."

Of true urinidrosis Hebra gives the following account. "This name is given to an affection in which, while the renal secretion is defective, the perspiration possesses a urinous smell. This character may either belong to the sweat generally or only to that which is formed at certain parts of the cutaneous surface. The older writers, Salmuth, Haesbart, Marcus Donatus, Arnold, and others, record cases in which, the urine being deficient in consequence of disease of the kidneys, the skin took up the function of these organs and became covered with an abundant urinous perspiration. Even by the thorough investigations of the chemists and physiologists Lehmann, Schottin, Schlorsberger, Liebig, Scherer, and Wöhler, it has not yet been proved to demonstration whether or no urea exists, as such, in the blood. Most writers are, however, of opinion that this is the case, and that the kidneys are merely excretors of this substance. Urea has, indeed, been often shown to be present in the circulating fluid; and the fact that attempts to detect it have sometimes failed by no means justifies the conclusion that this substance is formed elsewhere, and not in the blood, from the decomposition of nitrogenized substances. Such being the case, it is anything but unreasonable to suppose that when the secretion of urine

by the kidneys is interfered with the different solid tissues will be traversed by blood overloaded with urea, and, therefore, that this substance will be present in the sweat, as well as in the other fluids. Those who have made direct experiments in reference to this point have, however, very rarely succeeded in detecting urea in the perspiration, and certain chemists, among whom is Lehmann, even maintain that this has never yet been done. But the investigations of Schottin, Drasche, Freitz, Hirschsprung, and others, have furnished positive proofs that, under certain conditions, urea may be discovered in the cutaneous secretion. I may quote, especially, the observations made during the year 1855, when the cholera was raging in Vienna, by Drasche. In certain severe cases of that disease this physician observed, on the surface of the scalp and face, a scaly deposit, resembling fine white meal. On examining this substance he found it to contain crystals of oxalate of urea, of which the nature was determined both by their form and by their chemical reactions. It must be admitted, however, that such an alteration of the cutaneous secretion is exceedingly rare; and it has still to be shown which of the glands of the skin were concerned in the excretion of the urea. The crystals were, however, found by Drasche at those parts where the sebaceous glands are most abundant and of the largest size, and their presence was associated with the formation of sebum in excessive quantity. These facts are, of course, rather in favor of the supposition that the urea was, in these cases, excreted not by the sudoriparous, but by the sebaceous glands."

I have already stated in a previous part of this dissertation that I have observed the sweat to have a strong and well marked urinous odor in cases of suppression of urine, I will now cite some further authorities on this subject.

"When the urine has been suppressed in this way, it has occasionally escaped from some other part of the body; I saw a case where it passed from the skin—particularly of the palms of the hand. Others have passed it in the form of perspiration. There can be no doubt of the truth of these cases."—Elliotson's Practice, Amer. ed., p. 975. "Fourcroy first detected urea in perspiration, and observation subsequently confirmed by Landerer and others. That the skin can under certain circumstances excrete urea, is proved by the interesting fact that this substance sometimes occurs as a bluish powdery material on the body of those who have died of cholera."—Draper's Physiology, p. 240. Dr. Alfred B. Garrod says, "Uric acid has also been found in the cutaneous excretion of gouty patients in the form of a white powder, consisting of crystalized urate of soda." Simon says in his Ani-

mal Chemistry, "Uric acid is stated to have been found in the sweat of arthritic persons. Wolff found that the sweat which had hardened on the forehead into a solid white substance, in a patient with stone in the bladder, contained uric acid. Urate of soda is likewise stated to have been found in the sweat of persons suffering from gout or stone." Niemeyer says: "In a few instances of suppression of urine, trustworthy observers have discovered crystals of urea upon the skin." Dr. Robert Hooper remarks: "Thus, dropsy is sometimes carried off by perspiration, and the bad effects of the suppression of urine are occasionally obviated by a copious sweat of an urinous smell."

Boerhaave relates the following case: "A gentleman, from close attention to business, neglected to pass his urine; at length he lost the power of expelling it, and it was consequently drawn off by the catheter. On the third day after, the catheter being passed as usual, the bladder was found empty. On the fourteenth day he died. The symptoms on the sixth day were inaptitude for conversation, sleepiness, overpowering but unrestful, *offensive breath and perspiration*, quickened pulse, convulsion, lethargy, and death."

Dr. Johnstone, in the London Medical Commentaries, Vol. 5, mentions a case of suppression in which "for some days before death, the skin was all over as white as if it had been powdered. The white dust on being gathered was found to have the taste of crude salammoniac;" and a very rational explanation of this occurrence is offered, that the secretion of urine being prevented, the ammoniacal salts were determined to the skin in such quantity as to crystalize as the sweat evaporated. According to Schottin, in such cases this urea is found in pus and milk, and the sweat may contain so much of it as to form a crust upon the skin.

More recently, in the Deutsche Archives fur Klinische Medicin, Dr. Deiniger published the case of a boy, five years of age, who suffered from anuria renalis for a whole week, and on whose skin urea was discovered. Five cases of this kind have been recorded by Jurgensen and Leube; but the issue was fatal in all, whereas Dr. Deininger's patient recovered.

Treatment.—The treatment in these cases consists mainly in an attempt to restore the suspended function of the kidneys by appropriate measures, which should of course include, as the chief, removal of the cause of obstruction, if this can be done. Meanwhile, the vicarious action of the skin should not be interfered with, but rather encouraged, and perhaps supplemented by the action of hydragogue cathartics.

Of course in so grave a condition the prognosis must be in the highest

degree discouraging, and the longer the obstruction to renal function continues, be it what it may, the more hopeless does the patient's condition become.

VIII. *Phosphoridrosis*, or Phosphorescent Sweat.

Of all the anomalies of perspiration this is the most curious, and the rarest. Indeed, so uncommon are any phosphorescent phenomena in the living human body, that I shall include in this section all the notices of the condition which I have been able to find, of whatever character, and take them all together they are still very few.

Bartholin gives an account of a lady in Italy, whom he designates as *mulier splendens*, whose body shone with phosphoric radiations when slightly rubbed with a piece of dry linen.—Phipson on Phosphorescence, p. 162.

"In the annals of medicine there exist well established facts of the appearance of flames upon the bodies of persons affected with certain diseases. A phosphorescent perspiration of the feet has been spoken of, and it is curious to observe the analogy between the odor of the phosphorescent substance of the glow-worm and the sweat of the feet. All these cases of phosphorescence remain unexplained."—Matteucci, *Physical Phenomena of Living Beings*, p. 184.

"The subject of the following case was a male infant sixteen months old. The child had suffered from teething, and had been casually seen by Dr. H. McCormack, of Belfast. An emetic was administered, and an irritating liniment rubbed on the breast. The nurse in raising the child in bed at night, observed a phosphorescent light about the hips, both before and after the candle had been lighted. The legs were also observed to be luminous for a short time. From what Dr. McCormack could learn, the appearance very much resembled that produced by phosphorized oil, but none of this had been employed. The phenomenon occurred only once. The mother had, however, observed that on one occasion a spark had flown to her hand from the infant's body. Cases of human phosphorescence in the living body are rare, and the fact recorded by Dr. McCormack is therefore interesting."—*London Medical Gazette*.

I find the following in the *Cincinnati Lancet and Observer* for May, 1877, p. 504, which I give together with some additional particulars on the same subject in the *Boston Medical and Surgical Journal* for December 6th, 1877. Prof. Fargioni presented a paper to the Medico Physical Society of Florence on the phosphorescence of marine animals, and after it Prof. Panceri mentioned the case of a Neapolitan

physician who had eaten of fish and afterwards experienced malaise and nausea and presented the phenomenon of a luminous sweat. The physician related his case to Prof. Panceri while he was making some observations upon a phosphorescent fish, the *pesce bandiera*, found in the waters of Naples. Prof. Panceri did not hesitate to attribute the phosphorescence of his Neapolitan confrere to the elimination of the fatty matter of the fish; for he found by experimenting that patients, after eating the fat of Mediterranean fishes known to be phosphorescent, excreted a perspiration which was luminous in the dark. Hereupon another academician, Dr. Borgiotti, mentioned having seen phosphorescent sweat in a patient affected with miliaria, and this condition had alarmed the family of the patient in no slight degree and considerably astonished his physician, who, although he did not share their superstitions, was at a loss to explain the phenomena. But one of his colleagues, to whom he related the case, informed him that this condition had already been recorded in the history of miliaria. Recent investigations of Dr. E. Pflüger with phosphorescent fish show that the phenomenon never occurs while the fish is absolutely fresh. When the animal is preserved in a cool cellar, immersed in a three per cent. solution of common salt, the phosphorescence begins on the second evening about the cavities of the eyes, and slowly spreads over the whole surface, increasing daily until decomposition sets in, when it gradually ceases. It occurs only on surfaces exposed to the air. A fresh water fish was cut in two pieces, and these were placed in separate vessels in salt water. In one of them water from a vessel containing a phosphorescent sea fish was sprinkled. This after two or three days became phosphorescent, the other half remained absolutely dark. The matter scraped from the luminous surfaces, a whitish mucus, was found to contain numerous forms of schizomycetes. The phosphorescence is very faint, and can be perceived only by retinæ made sensitive by darkness. It has been detected in the urine as well as in the sweat, and seems, therefore, to depend upon the oxygenation of the living forms.

This question of evolution of light from the body is exceedingly interesting from the fact that it has so often received superstitious interpretation. The aureola about the head of the saints has really been authentically observed in advanced cases of phthisis. It is of course nothing else than the ignis fatuus, corpse light in cemeteries, &c., that is a phenomenon of phosphorescence. In 1842, Sir Herbert Marsh, of Dublin, wrote a paper on the Evolution of Light, from the living human subject, containing many interesting cases. This paper I have not been able to obtain, but a resumé of it is given in Carpenter's Physiology, from which I quote what follows.

" Dr. W. Stokes narrates the case of a patient who was under his observation, some years since, in the old Meath Hospital, having been admitted on account of an enormous cancer in her breast, which was in an advanced stage of ulceration, the edges being irregular and everted ; every part of the base and edges of this cavity was strongly phosphorescent, the light being sufficient to enable the figures on a watch dial to be distinguished within a few inches ; and here also it appeared that the luminosity was due to a particular exudation from the exposed surface. Three cases are recorded by Sir H. Marsh, in which an evolution of light took place from the living body, without any such obvious source of decomposition ; all the subjects of these cases, however, were in the last stage of phthisis ; and it can scarcely be doubted that here, as in other disease of exhaustion, incipient disintegration was taking place during the latter periods of life. The light in each case is described as playing around the face, but not as directly proceeding from the surface ; and in one of these instances, which was recorded by Dr. D. Donovan, not only was the luminous appearance perceptible over the head of the patient's bed, but luminous vapors passed in streams through the apartment. It can scarcely be doubted that it was here the breath which contained the luminous compound, more especially as it was observed in one of the cases to have a very peculiar smell ; and the probability that the luminosity was due to the presence of phosphorus in process of slow oxidation, is greatly increased by the fact, that the injection of phosphoretted oil into the blood vessels gives rise to a similar appearance. In repeating this experiment, Sir H. Marsh states that when half an ounce of olive oil, holding two grains of phosphorus in solution, was injected into the crural vein of a dog, a dense white vapor began to issue from the nostrils even before the syringe was completely emptied, which became faintly luminous on the removal of the lights ; and the injection being repeated with the same quantity, the expiration immediately became beautifully luminous, resembling jets of pale colored flame pouring from the nostrils of the animal. And the luminosity which has been occasionally observed in the urine, may fairly be imputed to an increase in the quantity of unoxidized phosphorus which it seems normally to contain ; its liberation taking place at a more rapid rate than its conversion into phosphoric acid, either through excessive secretion, or impeded respiration. In Casper's *Wochenschrift*, 1849, No. 15, a case has been put on record in which the urine and semen of a patient who was under treatment for impotence and spermatorrhea, and who was employing phosphorus as a remedy both internally and externally,

were observed to be luminous. A case has been recorded by Raster in which the body linen was rendered luminous by the perspiration after any violent exercise; and here, too, the cause may be presumed to have been the same. On the whole, then, we may conclude the occasional evolution of light from the human subject to be the consequence of the production of a phosphorescent compound at the expense of the disintegrating tissues, or its introduction from without; which compound passes off through one of the ordinary channels of excretion.'

In addition to the anomalies of perspiration which we have already noticed, there are a few isolated statements with regard to peculiarities of this secretion, which may fittingly receive a passing notice at the conclusion of this treatise. As for instance, Mayer, *Die Elementar-organization des Seelenorgans*, p. 12, remarks that some are said to have the power to perspire at will.

Many writers of good repute, such as Ledel, Frommann, Lanzoni, Paulini, Helwick, and Speranza, are quoted by Joseph Frank, (*Hautkrankheiten*, iii Theil, p. 312, Leipzig, 1843) as having asserted that they have seen sweat formed after death. Of course no such thing as genuine perspiration has taken place under these circumstances; the sweating referred to can only be that deposit of moisture which is referred to by the common people when they say a pitcher or goblet sweats, &c., in short, the condensation of the watery vapor always present in the atmosphere—or dew. If these writers had lived in our day, when it is so common to place dead bodies upon ice, they might have witnessed this phenomenon as often as they pleased.

Among the abnormal constituents observed in the sweat in addition to those already noticed in this paper, I may mention the following:

Albumen—has been observed by Anselmino in a critical sweat, which broke out in large quantity one evening over the whole body in a case of febris rheumatica, with severe pains in the joints; on the following day it had disappeared. Stark asserts that albumen may be found in the sweat in gastric, putrid, and hectic diseases, and also on the approach of death, in consequence of the abnormal solution of the solid constituents. Simon says he failed in detecting any certain indications of albumen in sweat collected (by means of linen washed with distilled water) from the breast of a person in the colliquative stage of tubercular phthisis. W. Leube (*Virchow's Archives*) has investigated this question, and after careful experiment has detected albumen in the secretion of the skin in four cases. Three of the cases were suffering from chronic disease, one with old anchylosis, one with roseola

syphilitica, and one with sciatica. The fourth case was that of a hospital nurse. In all the cases it was necessary to collect at least 300 c.c.m. before proceeding to test for albumen. This quantity filtered and concentrated, responded in each case to proper tests. The patient with traumatic ankylosis showed a larger percentage of albumen, both relative and absolute, than either of the other cases. The woman with sciatica (aged 51) showed only traces of albumen. The hospital nurse gave a secretion responding readily to the albumen tests. The urine in each case was free from albumen. The concentrated secretion on being treated with carbonic acid gas and acetic acid does not become opaque; it contains, therefore, neither para globulin nor kali albumen, but consists chiefly of serum albumen.

In all the cases the secretion was obtained by packing in woolen blankets after subjecting the patients to a hot bath, the sweating was therefore forced and abnormal, and the question whether albumen is a constant ingredient of the perspiration under ordinary circumstances is still an open one, to be decided by future investigations. (1870.)

Fat—is stated to occur in colliquative hectic sweats.

Sugar—has been detected in the sweat in cases of diabetes, by several good chemists.

Mercury.—The bichloride taken by the mouth has been recognized in the urine two hours, and in the salivation four hours, after its ingestion; still later it is found *in the sweat*, and in the milk of nursing women. Bumstead and Taylor on Venereal, p. 804.

THE OHIO MEDICAL RECORDER,

A Monthly Journal of Rational Medicines.

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PUBLISHERS:

COTT & HANN,

Columbus, O.

COBB, ANDREWS & CO.,

Cleveland, O.

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